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NATIONAL DAM SAFETY PROGRAM. GLEN WILD LAKE (NJ00222). PASSAIC --ETC(U).
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PASSAIC RIVER BASIN

MUD RUN, PASSAIC COUNTY

NEW JERSEY

GLEN WILD LAKE

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

NJ 00222

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE - 2D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

JULY 1978

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

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Glen Wild Lake
Passaic County, N.J

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(10) Jerome Morrow Normamm

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Copies are obtainable from National Technical Information Service, Springfield, Virginia, 22151.

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National Dam Safety Program Phase I
Dam Safety
Dam Inspection. Glen Wild Lake Dam, N.J.

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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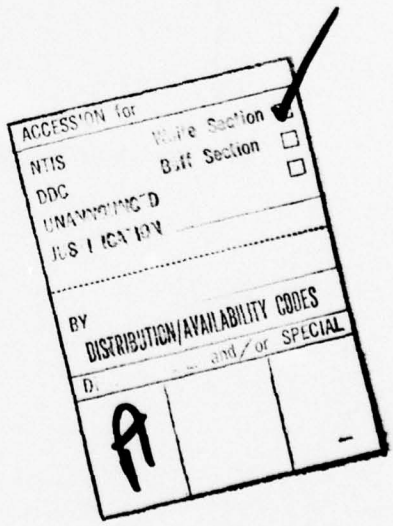

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE—2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO
NAPEN-D

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

1 SEP 1978

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Glen Wild Lake Dam in Passaic County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given on the first four pages of the report.

Based on visual inspection, available records, calculations and past operational performance, Glen Wild Lake Dam, initially listed as a "high" hazard potential structure but reduced to a "significant" hazard potential structure as a result of this inspection, is judged to be in poor overall condition. The decision to consider the dam a "significant hazard potential structure," instead of a "high hazard potential structure" as stated by the consultant, is based on the dam's intermediate size, low head, and expectation that failure of the structure would probably result in few losses of life and minor economic loss. The dam's spillway is considered inadequate since 43 percent of the Probable Maximum Flood (PMF) would overtop the dam (34 percent with flashboards in place). To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The actual capacity of the spillway should be determined using more precise and sophisticated methods and procedures by a qualified professional consultant, engaged by the owner. This study should be completed within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and prevent overtopping should be initiated within calendar year 1979.

b. Within 30 days from the date of approval of this report, a qualified professional consultant should be engaged, by the owner, to conduct a subsurface investigation and laboratory testing program to

determine the nature of the materials in the earth embankment and the foundation of the concrete gravity section. This should include installation of piezometers in the earth embankment to periodically monitor the integrity of the core wall. An analysis (including flow nets) should also be made of the phreatic conditions in the downstream section of the earth embankment to determine piping potential. A complete stability analysis should then be made using the above data to determine the actual static and seismic stability of concrete gravity and earth embankment sections. Any remedial measures found necessary to insure the stability of the structure should be initiated in calendar year 1979.

c. Within the below specified times from the date of approval of this report the following actions should be initiated.

(1) All trees on the earth embankment that die, fall over, etc. should be removed within 30 days thereafter along with stumps, roots and peatmoss, and the holes backfilled and seeded with grass. New tree growth must be prevented.

(2) Structural cracks and cracks in the cement mortar cover of the concrete gravity section should be further investigated and repairs initiated within six months.

(3) The eroded areas along the downstream toe of the concrete gravity sections should be refilled using materials and procedures approved by a qualified professional consultant within one year.

(4) The corroded nuts and bolts on the bonnets of the 16-inch valves should be replaced within one year.

(5) The support of the last section of the 48-inch reinforced concrete pipe should be repaired within six months.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman Robert A. Roe of the Eighth District. Under the provisions of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, thirty days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia, 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

NAPEN-D
Honorable Brendan T. Byrne

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely yours,

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

Cy furn:
Mr. Dirk C. Hofman, P.E.
Department of Environmental Protection

GLEN WILD LAKE DAM (NJ00222)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 25 and 26 May 1978 by Gilbert Associates, Inc. under contract to the State of New Jersey. The state, under agreement with the U. S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

The Glen Wild Lake Dam, initially listed as a "high" hazard potential structure but reduced to a "significant" hazard potential structure as a result of this inspection, is judged to be in poor overall condition. The decision to consider the dam a "significant hazard potential structure," instead of a "high hazard potential structure" as stated by the consultant, is based on the dam's intermediate size, low head, and expectation that failure of the structure would probably result in few losses of life and minor economic loss. The dams spillway is considered inadequate since 43 percent of the Probable Maximum Flood (PMF) would overtop the dam (34 percent with flashboards in place). To insure adequacy of the structure, the following actions, as a minimum, are recommended:

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b. Within 30 days from the date of approval of this report, a qualified professional consultant should be engaged, by the owner, to conduct a subsurface investigation and laboratory testing program to determine the nature of the materials in the earth embankment and the foundation of the concrete gravity section. This should include installation of piezometers in the earth embankment to periodically monitor the integrity of the core wall. An analysis (including flow nets) should also be made of the phreatic conditions in the downstream section of the earth embankment to determine piping potential. A complete stability analysis should then be made using the above data to determine the actual static and seismic stability of concrete gravity and earth embankment sections. Any remedial measures found necessary to insure the stability of the structure should be initiated in calendar year 1979.

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(1) All trees on the earth embankment that die, fall over, etc. should be removed within 30 days thereafter along with stumps, roots and peatmoss, and the holes backfilled and seeded with grass. New tree growth must be prevented.

(2) Structural cracks and cracks in the cement mortar cover of the concrete gravity section should be further investigated and repairs initiated within six months.

(3) The eroded areas along the downstream toe of the concrete gravity sections should be refilled using materials and procedures approved by a qualified professional consultant within one year.

(4) The corroded nuts and bolts on the bonnets of the 16-inch valves should be replaced within one year.

(5) The support of the last section of the 48-inch reinforced concrete pipe should be repaired within six months.

APPROVED: James G. Ton

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

DATE: 1 September 1978

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Glen Wild Lake
State:	New Jersey
County:	Passaic
U.S.G.S. Squad Sheet:	Wanaque, N.J.
Coordinates:	N41°01'18" E74°19'36"
Stream:	Mud Brook
Date of Inspection:	25, 26 May, 1978

ASSESSMENT OF GENERAL CONDITIONS

The concrete gravity sections as well as the earth embankment section of this dam are in poor condition as defined in Appendix J. The field investigations and analysis recommended below should be initiated immediately by the owner. The spillway capacity is adequate to pass 42 percent of the Probable Maximum Flood (PMF) without the flashboards in position and 33 percent of the PMF with the flashboards in place. The owner's attention is directed to the following items:

1. A subsurface investigation and laboratory testing program should be conducted for the earth embankment and the concrete gravity section including the installation of piezometers.

2. An analysis should be made to determine piping potential of the embankment section.

3. A complete stability analysis should be made using data obtained from 1 above to determine the actual static and seismic stability of the concrete gravity and embankment sections.

4. The stability of the dam should be increased possibly through the installation of rock-bolt anchors and other additional modifications such as drain holes etc., if required.

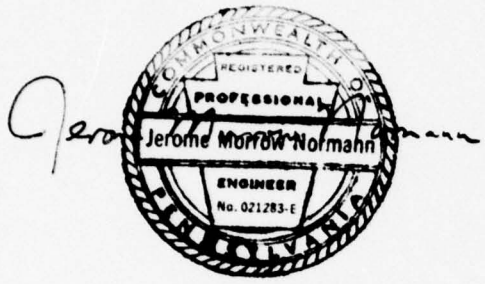
5. All trees on the earth embankment that die, fall over, etc. should be removed immediately thereafter along with stumps, roots and peatmoss, and the holes backfilled. New tree growth must be prevented.

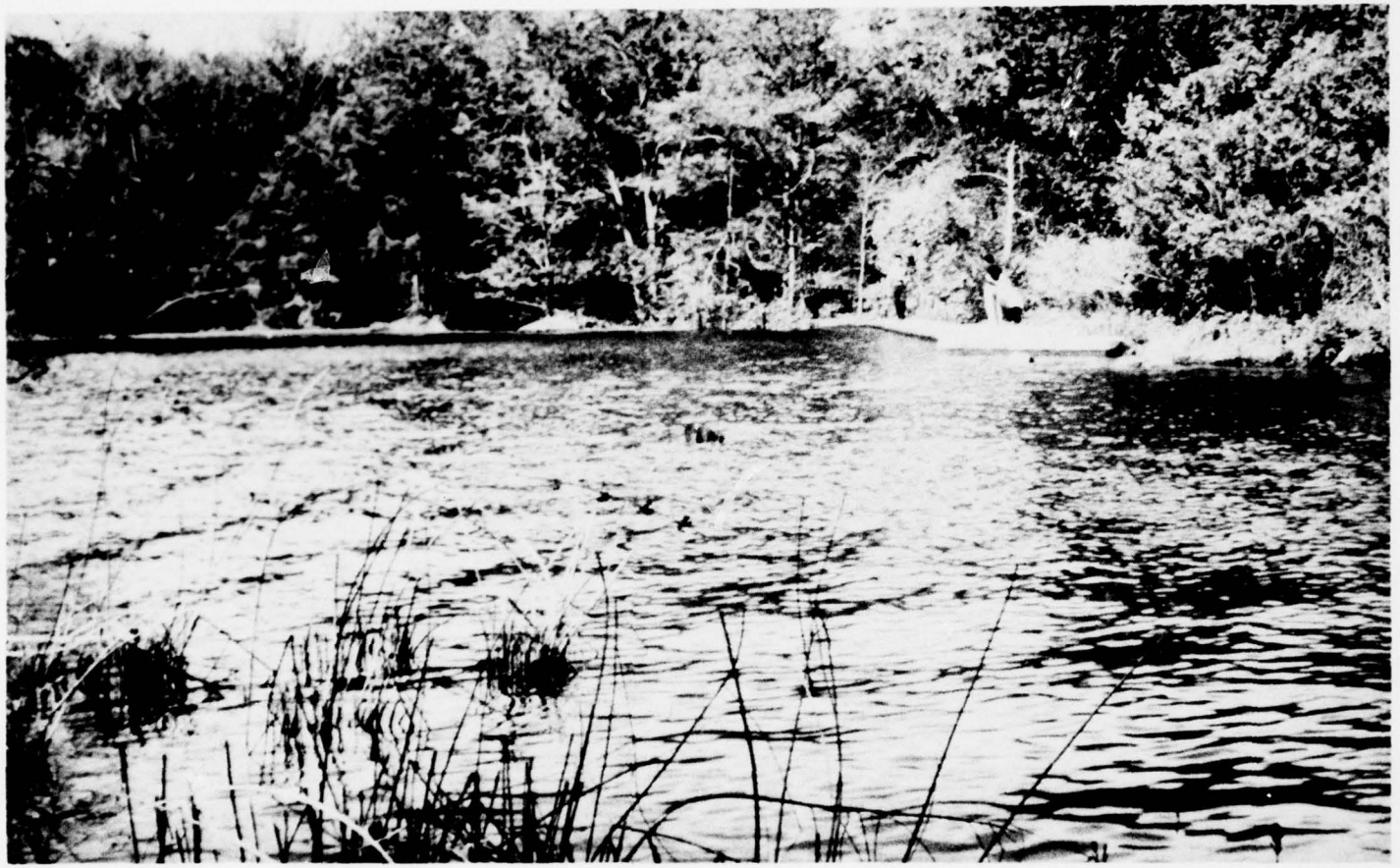
6. Structural cracks and cracks in the cement mortar cover of the concrete gravity section should be further investigated and repaired soon.

7. The eroded areas along the downstream toe of the concrete gravity sections should be refilled in the near future.

8. The corroded nuts and bolts on the bonnets of the 16-inch valves should be replaced in the near future.

9. The support of the last section of the 48-inch reinforced concrete pipe should be repaired soon.





May 1978

OVERVIEW
GLEN WILD DAM

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

CONTENTS

1.0 PROJECT INFORMATION

1.1 GENERAL

1.1.1 Authority: Public Law 92-367, 8 August 1972, authorized the Secretary of the Army, through the U.S. Corps of Engineers to initiate a national program of safety inspections of non-Federal dams throughout the United States. Gilbert Associates, Inc. (GAI) has entered into contract No. DACW61-78-C-0-114 with the Philadelphia Office of the U.S. Corps of Engineers to inspect this dam, Gilbert Work Order 06-7249-000.

1.1.2 Purpose of Inspection: The purpose is to conduct a Phase I inspection according to the U.S. Army Corps of Engineers Recommended Guidelines for the Safety Inspection of Dams (Reference 7) and contract requirements between Gilbert Associates, Inc. and the U.S. Army Corps of Engineers. The objectives are to expeditiously identify whether the dam poses an immediate threat to human life and property and to recommend future studies and/or any obvious remedial actions that may be indicated by this inspection.

1.2 PROJECT DESCRIPTION

1.2.1 Dam and Appurtenances: Glen Wild Dam is a combination of two different sections: a 305 foot long concrete gravity dam and a 241 foot long earth embankment. The concrete gravity dam with a 20 foot wide spillway has a maximum height of 21-feet above original ground, and a 110 foot cut off wall at the south end. The earth embankment has a maximum height of 16-feet above original ground, and a rubble masonry and cyclopean concrete core wall down to ledge rock or impervious soils. The concrete gravity section has a 20 foot spillway and was reputedly founded on a gneissic bedrock. Two 16-inch pipes in a valve pit have been used to periodically lower the water level approximately 5 feet whenever shoreline maintenance has been scheduled.

1.2.2 Location: Glen Wild Lake is located about 1-1/4 miles north of Bloomingdale, N.J., in Pompton Township, Passaic County, N.J., and about 2 miles west of the Wanaque River. The dam is located on the former Mud Brook, which used to drain Mud Pond. Spillway discharges presently flow into Lake Ioscoe, about .5 mile northeast of the dam. Geologically, the dam is located within the physiographic province of the Precambrian Highlands; the rocks exposed at the site are chiefly biotite gneiss with formation striking N2° - 12°E and dipping 40° - 61°SE (See Appendix F).

1.2.3 Size Classification: The dam is classified in accordance with Section 2.1.1 of Reference 7, as an intermediate size dam based on its storage of approximately 2,625 acre-feet.

1.2.4 Hazard Clarification: In accordance with the requirements of Section 2.1.2 of Reference 7, the Glen Wild Dam is classified in the high hazard potential category.

1.2.5 Ownership: The lake and dam have been owned since March 1978 by the Glen Wild Lake Association, Inc., of Bloomingdale, N.J. Its address is:

Glen Wild Lake Association, Inc.
c/o Mr. Herbert Califano
P.O. Box 7
Bloomingdale, N.J. 07403

1.2.6 Purpose of Dam: The dam was built in 1918 by the Glen Wild Lake Company of Butler, N.J. to create a lake for a real estate development. The reservoir absorbed Witteck Lake and Mud Pond, and has a total area of about 175 acres.

1.2.7 Design of Construction History: The dam was designed by William H. Boardman, Consulting Engineer, of 71 Mapes Avenue, Newark, New Jersey. Construction of the dam was by John W. Heller, Engineering Contractor, of South Orange, New Jersey. Construction was started in October 1917 and completed in July 1918. Some seepage through the higher elevations of the ledge rock was anticipated at that time. The dam design drawing uses a reference elevation of 100; the water flowing over the spillway at elevation 102 approximately corresponds to an elevation 351 feet M.S.L.

According to the feasibility report of Department of Conservation and Development, State of New Jersey, dated October 31, 1917 (see Appendix F) the entire length of the concrete gravity dam will act as a spillway. The spillway rating curve as calculated by GAI is shown in Figure D-3 of Appendix D.

1.2.8 Normal Operating Procedure: The only operating procedure consist of removing the 9 inch high flashboards installed at the 20-foot wide spillway in times of heavy runoff, to prevent flooding of some of the properties located on the lake. The two valved 16 inch pipes which are located in a valve pit about 30 ft south of the spillway are used once in every 5 years to lower the water level about 6 feet so lake front property owners can perform maintenance on their bulkheads. The lake was drained in 1960, 1967, 1970, 1972, 1975. The next scheduled draining will be in 1980 after Labor Day.

1.3 PERTINENT DATA

1.3.1 Drainage Area: 665 Acres (1.04 sq. mi)

1.3.2 Discharge at Dam Site

Gated spillway capacity at pool elevation: Not applicable.
Gated spillway capacity at maximum pool elevation: Not applicable.
Ungated spillway capacity at max. pool elevation: Not applicable.
Total spillway capacity at maximum pool elevation: 1540 cfs.

1.3.3 Elevation (feet above M.S.L.)

Top of earth dam: approximately 353 feet
Spillway Design Flood (SDF) Surcharge: PMF = 354.1 feet
Full flood control pool: Not applicable
Recreation pool: 351.00 (without flashboards)
Spillway crest: 351.00 (without flashboards)
Upstream portal invert diversion tunnel: Not applicable
Top of low concrete gravity dam section: 351.25
Top of intermediate concrete gravity dam section: 352.04
Top of high concrete gravity dam section: 352.20
Downstream portal invert diversion tunnel: Not applicable
Streambed at centerline of dam: 338.00
Maximum tailwater: Not available

1.3.4 Reservoir

Length of maximum pool: 4500 ft.
Length of recreation pool: 4500 ft.
Length of flood control pool = Not applicable

1.3.5 Storage (Acre-ft)

Recreation pool: 2625
Flood control pool: Not applicable
SDF surcharge: PMF 3167
Top of dam: 2982

1.3.6 Reservoir Surface Area (Acres)

Top of dam: 175
SDF surcharge: 175
Flood control pool: Not applicable
Recreation pool: 175
Spillway crest: 175

1.3.7 Dam Type: a. Concrete Gravity
b. Earth Embankment With Concrete Core Wall

Length	a	305.0 ft
	b	241.0 ft
Height	a max.	21.0 ft (at former streambed of Mud Brook
	b max.	16.0 ft
Width	a	3.0 ft
	b	8.0 ft
Side Slopes	a	7 inches/foot
	b	2.5(H):1(V) & 2(H):1(V)
Zoning	b	Concrete core wall
Impervious Core	b	Concrete core wall extended to ledge rock or into impervious soil (according to construction drawing)
Grout Curtain	-	None.

1.3.8 Diversion & Regulating Tunnel: Not Applicable

1.3.9 Spillway:

a. Spillway Crest at elevation 351; length = 20 feet
b. Low concrete gravity dam: Top at elevation 351.75; length = 65.2 feet
c. Intermediate concrete gravity dam: Top at elevation 352.04; length = 116.0 feet
d. High concrete gravity dam: Top at elevation 352.20; length = 104.3 feet

1.3.10 Regulating Outlets

Pipe diameter: 16 inches
Number of pipes: 2
Pipe invert elevation: 345.7 feet above M.S.L.

2.0 ENGINEERING DATA

2.1 DESIGN: A plan, profile, and sections through both portions of the dam are shown on microfilmed data available at the New Jersey Department of Environmental Protection (DEP) Division of Flood Plan Management, Trenton, New Jersey. No design calculations of any kind are available.

2.2 CONSTRUCTION: There are no construction records available except for microfilmed specifications and inspection correspondence at DEP. This data is not sufficient to evaluate the dam sections.

2.3 OPERATION: There is no other operation data available for this dam except for the years that the lake level was lowered (see 1.2.8), and that in 1967 the dam concrete gravity section of the was overtopped, and water flowed over South Road. Insignificant damages resulted from the overtopping (Reference 8).

2.4 EVALUATION

a. Availability - A design drawing showing plan, cross sections and profile of the dam, and an investigation report from the State of New Jersey on the permit application are the only data available for evaluating the dam.

b. Adequacy - The microfilmed data (see paragraph 2.1) produces a very poor quality drawing. Re-drafting is necessary before said drawing is useable.

c. Validity - The visual inspection of the dams indicated that the appearance of the superstructures of the dams does not conform with the dams as designed (see section 6.1.4).

3.0 VISUAL INSPECTION

3.1 FINDINGS

3.1.1 General

The phase 1 dam inspection was performed on May 25-26, 1978 by a team of Gilbert Associates, Inc. (GAI) engineers. A previous inspection of this dam was performed on October 3, 1977 by Ernest Chrisbacher, a consulting civil engineer in Wayne, New Jersey; a copy of his report is attached as Appendix E. The findings of the GAI inspection are as follows:

3.1.2 Dams

a. Concrete Gravity Section - The right spillway abutment showed a 1/2 inch wide surface crack running from near the spillway crest to the abutment rock at 45°; there was no seepage observed along the crack. A horizontal crack was observed over the full length of the 20-foot spillway section; however, discharge water prevented closer investigation of this crack. At the last horizontal change in direction of the dam, 79.5 feet south of the spillway, the concrete was cracked through the crest and downstream side, and has been strengthened through addition of extra concrete on the upstream side. Apparently the repairs and additional concrete were necessary because of extensive structural cracking. No vertical or horizontal alignment deviation was noted at the cracked areas. This area also shows signs of having been overtopped as indicated by erosion marks along the concrete dam toe. The section north of the spillway shows extensive scouring of soil along the toe of the dam, up to 36-inches depth in places.

b. Earth Embankment Section - Small vertical displacements along the top of the embankment were observed. The downstream embankment slopes were irregular in shape. Trees and shrubs were growing extensively on the embankment and random peat-moss deposits from the lake were covering the ground at and beyond the toe area. The upstream slope was adequately protected by riprap except where trees had displaced the stone paving. The average height of the embankment crest above the water level was 1.83 feet at the time of inspection with one flashboard in place.

c. Seepage - Minor seepages were observed in the following areas:

1. Concrete gravity section: Around the downstream toe area near the spillway, where the dam is in contact with fractured foundation rocks. Along the downstream face occasional moist areas were observed.

2. Earth Embankment: Beyond the downstream toe of the embankment.

d. Appurtenant Structures - The only appurtenant structure is a concrete block valve pit with two chambers, and a cover consisting of precast concrete planks. The pit houses two 16 inch diameter gate valves installed at the end of two 16 inch cast iron pipes that are used for draining the lake (see Figure 4). When the drain pipes are in use, the water discharges into a small stilling chamber from which it flows back to Mud Brook by means of a 48 inch diameter pipe. The 48 inch reinforced concrete drain pipe, about 52 feet long, seems quite new. The last section of this pipe is losing support and will shortly fall into the discharge channel (Mud Brook).

e. Reservoir Area - The lake frontage properties have either concrete block bulkheads, natural slopes covered with grass, or random rock, to the water's edge. The lake rim appears to be stable.

f. Downstream Channel - The boulder strewn and bedrock-exposed bottom of the channel forms a natural energy dissipator. However, excessive lateral erosion and deposition of peat moss washing down from the reservoir, have apparently taken place during the last overtopping. The discharge channel crosses under South Road via a 5.0 foot boiler plate pipe.

3.2 EVALUATION

Based on the findings of the visual inspection the concrete gravity section is in a poor condition with some minor surface cracking, spalling and seepage. The spillway crest surface appears in good condition; the right downstream spillway abutment exhibits cracking of the cyclopean concrete, as does the downstream face of the spillway.

The earth embankment section, with uneven top, irregular sideslopes and dense cover of trees and brush, is also in poor condition. Dense tree growth on the entire embankment jeopardizes the integrity and safety of the embankment as the root system of the trees may penetrate deeply to and even through the concrete core wall. After the death of the tree and decay of the root system, voids will be left in the embankment.

Evidence of lateral and differential erosion can be seen along the upper part of the discharge channel and in its vicinity below the spillway, probably due to the past overtopping of the concrete section. Peat moss found covering the ground below the dam is highly erodible material and a retardation to the free flow of discharge. It is suspected that the backwater of the tailwater during overtopping of the concrete section may extend to the toe area of the earth embankment section, which may cause excessive erosion and undermining of the toe area leading to slope failure.

The bolts and nuts on the bonnet flanges of the two 16 inch cast iron drain pipes contained in the valve pit need to be replaced as they are severely corroded.

3.3 ATTENDEES

Gilbert Commonwealth Associates, Inc.
Rudolph J. Wahanik
Fine T. Hsu
Rudy P. Visser

Glen Wild Lake Environmental Committee
W. B. Park, Jr.
92 Wood Place - Bloomingdale, New Jersey

4.0 OPERATIONAL PROCEDURES

4.1 PROCEDURES

The water level in Lake Glen Wild is regulated by the spillway to a pool elevation of approximately 351.00 ft, and using flashboards to an elevation of 351.50 ft. In 1967, the dam was overtopped over the whole length of the concrete section and water flowed over South Road. Other than the procedures outlined in paragraph 1.2.8 there are no additional operational procedures at Glen Wild Lake Dam.

4.2 MAINTENANCE OF DAM

There is no maintenance of the dam(s). Neither concrete gravity section nor earth embankment section shown any signs of maintenance - except for the repairs effected to reinforce the structural cracking at the bend 79.5 feet south of the spillway. Maintenance recommendations by E. Chrisbacher, who had inspected the dam in September 1977, have not been followed.

4.3 MAINTENANCE OF OPERATING FACILITIES

The recommendations contained in E. Chrisbacher's report for replacement of the bonnet nuts and bolts on the two 16 inch gate valves have not been followed.

4.4 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

There is no warning system in effect.

4.5 EVALUATION

There is a complete lack of maintenance procedures for this dam. None of the recommendations by E. Chrisbacher in a report dated October 3, 1977 to correct possible hazardous conditions and enhance the safety of the dam have been followed (see Appendix H).

5.0 RESERVOIR HYDROLOGY AND DRAWDOWN

The hydrologic analyses presented in this report pertain to present hydrologic conditions and do not consider future changes produced by uncertain conditions such as urbanization, forest fires, or other modifications within the watershed. Details on the methodology used, the results of HEC-1 runs, the spillway performance and the determination of the reservoir drawdown times are presented in Appendix D.

5.1 EVALUATION OF FEATURES

Plan and cross sections of the spillway and of the dams were available at the office of the Department of Environmental Protection (DEP) in Trenton, New Jersey. However, the structure was not built according to the drawings. Therefore a field survey of the as built structure was conducted and the resulting dimensions (Figures 3 and 4) were used to determine the appropriate discharge coefficients when the discharge capacity of the structure was evaluated.

5.2 MAJOR FLOODS

Information concerning major floods or peak discharges at the dam site are not available but erosion on the downstream toe of the concrete gravity section of this dam indicates overtopping of the concrete gravity sections. There is no record or telltale signs which indicate that the earth embankment has ever been overtopped.

5.3 SPILLWAY DESIGN FLOOD

Information concerning flow records or major floods at the dam site are not available. The drainage area at the dam site is 665 acres (1.04 sq. mi.).

Since the dam is classified in the intermediate size category and has a high hazard potential, the spillway capacity will be reviewed to determine whether it can pass floods of a magnitude equal to the PMF.

An estimate of the Probable Maximum Flood (PMF) was made for the Glen Wild Dam. A simple triangular unit hydrograph was developed from the drainage area and estimated time to peak (Reference 1). This unit hydrograph and Probable Maximum Storm data (Reference 2) were used as input to the HEC 1 Computer Program (Reference 3) which developed the PMF. The magnitude of the PMF is 5870 cfs.

5.4 SPILLWAY CAPACITY

The combined discharge rating curve for the spillway and the concrete gravity dam sections is shown in Figure D-3. The discharge is cfs calculated at different reservoir water levels with and without flashboards in place is:

Pool Elevation (Ft, MSL)	Outflow Without Flashboards (cfs)	Outflow With Flashboards (cfs)
351 (a)	0.	0.
351.4	20.	0.
351.75 (b)	51.	4.
352.04 (c)	110.	44.
352.2 (d)	173.	100.
352.7	610.	510.
353.04 (e)	1040.	930.
353.50	2040.	1910.
354.0	3660.	3500.
355.0	8000.	7800.

(a) Crest of spillway
(b) Top of low concrete gravity dam
(c) Top of intermediate concrete gravity dam (left of the spillway)
(d) Top of high concrete gravity dam (right of the spillway)
(e) Top of earth dam

The maximum combined discharge capacity of the spillway and the concrete gravity dam section before overtopping the earthen portion of the dam is:

With flashboards in place	1040 cfs
Without flashboards	930 cfs

5.5 SPILLWAY PERFORMANCE

The Glen Wild reservoir has 2625 acre-ft. of storage at the normal pool elevation and it was assumed that the reservoir would be full at the time of occurrence of the spillway design flood, or at elevation 351.00-foot.

To estimate the maximum spillway surcharge elevation and to assess the safety of the Glen Wild Lake dam, the spillway design hydrographs equivalent to 100, 50, 40, and 30 percent of the PMF were routed through the reservoir using the HEC-1 Computer Program (Referene 3).

The results of the HEC-1 computer run with and without the flashboards in place are:

a. Without the flashboards:

Description	Units	PMF	0.5. PMF	0.4 PMF	0.3 PMF
Peak Inflow	cfs	5870	2930	2350	1760
Runoff Volume	Acre-ft	1393	697	557	418
Peak Outflow	cfs	4290	1500	936	533
Water Level	ft(msl)	354.1	353.2	353	352.6
Dam Overtopping	ft	1.1	0.2	0	0

b. With flashboards:

Description	Units	PMF	0.5 PMF	0.4 PMF	0.3 PMF
Peak Inflow	cfs	5870	2930	2350	1760
Runoff Volume	Acre-ft	1393	697	557	418
Peak Outflow	cfs	4430	1730	1260	799
Water Level	ft(msl)	354.2	353.4	353.2	352.9
Dam Overtopping	ft	1.2	0.4	0.2	0

The maximum capacity of the existing spillway before overtopping of the earthen portion of the dam is 42 percent of the PMF outflow peak when the flood routing is performed for the spillway without flashboards and 33 percent if the flashboards are in place. If overtopping does result, dam failure due to erosion of the earth embankment would be quite possible. Due to its location, failure of the Glen Wild Dam could result in a minor economic loss. A few losses of life are expected to occur because there is at least one dwelling located 0.5 miles downstream of the dam along Mud Brook at the shoreline of Lake Ioscoe.

5.6 RESERVOIR DRAWDOWN

Discussions with Mr. Chuck Youngter, who is a member of the Glen Wild Lake owner's association and who performed the reservoir drawdown three times, disclosed that it takes approximately two weeks to lower the level of the lake five feet from the spillways crest down to the two 16 inch diameter drain pipes. The reservoir will be lowered next after Labor Day in 1980 so that the owners who have homes along the shoreline can repair and maintain their docks. Further, Mr. Youngster said that the average depth of the reservoir is 15 ft with the maximum depth being 26 ft.

Capacity curves for this reservoir are not available and since the reservoir is surrounded by vertical rock walls, it was assumed that the reservoir volume varies proportionally with depth in the upper five ft that can be lowered. Therefore, the time required to drawdown the lake from elevation

351 to elevation 346 through the two 16 inch drainage pipe with a Manning's n = 0.015 and an inflow of 2 cfs per sq. mi. is:

Reservoir Water Level ft	Reservoir Capacity Acre-ft	Total Drawdown Time in days
351	2625	0
350	2450	2.95
349	2275	6.34
348	2100	10.45
347	1925	16.09
346	1750	32.73

It is pertinent to note that the lake cannot be lowered below elevation 346.00 ft without breaching sections of the concrete gravity dams or the earth dam.

6.0 DAM STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

6.1.1 Visual Observations

Signs of distress or other existing conditions that were observed during the visual inspection did not indicate that the dam is in an imminent hazard condition. Cracks were seen at some locations on the concrete section. The cracking of the concrete section is described in section 3.1.2.a.

The top of the earth dam was uneven, and its downstream slope irregular. Excessive growth of vegetation on the dam was also noticed, which may have an adverse effect on the dam's safety.

Scouring along the downstream side of the concrete dam, and erosion along the upper part of the discharge channel was seen likely to extend to the toe of the earthdam affecting its stability.

6.1.2 Design and Construction Data

The concrete gravity section of the dam is founded entirely on bedrock according to the design drawing, and the concrete wall of the earth embankment section of the dam is reputedly founded either on bedrock or so-called "blue clay" according to the drawing.

Design data shows that the top of the concrete core wall of the earth dam is at elevation 352.50 feet and that the design water level in the lake is at elevation 351.25 feet.

6.1.3 Operating Records

There are no operating records available for this dam.

6.1.4 Post Construction Changes

The spillway which was designed as a 6-foot section at elevation 351.00 feet within a 40-foot section at elevation 351.25 feet according to the construction drawing has been changed to a 20-foot section at elevation 351.0 feet next to a 65.2-foot section at elevation 351.75 feet. The 20-foot section includes provisions for flashboards. The concrete section with the 3-foot wide crest was designed to be approximately 214 feet long including the spillways. The as built dimension is approximately 305 feet. The 1.5 foot wide (at the crest) wall section was designed to be approximately 83 feet long; this section now measures 109.7 feet. Also one 18° bend in this wall section shown on the construction drawing was eliminated. It is not known

when these changes were effected; they may have been incorporated during construction. It is not known when the valve pit and mixing chamber were built.

6.1.5 Seismic Stability

The dam is located within Zone 1 on the Algermissen Seismic Risk Map of the United States (1969 edition) and there are uncertainties with respect to the static stability of the dam, as described in paragraph 6.2. Therefore, in accordance with paragraph 3.6.4 of Reference 1 of Appendix I, assessments should be made regarding seismic stability, based on the studies outlined in paragraph 7.2.1.

6.2 CALCULATION RESULTS

Two conditions of loading were considered in the stability analysis. These conditions were chosen to represent the normal loading on the dam during summer and winter conditions.

The two conditions investigated are:

Condition A - Water level at top of the structure with full uplift.

Condition B - Water level at spillway crest level and one foot thick ice cover exerting 5000 lbs/sq. ft.

The spillway section was analyzed for Condition A, and B without silt loading considerations.

The concrete gravity section was analyzed for Conditions A and B and in all cases loading produced by an upstream 3 feet thick silt deposition.

Since the foundation conditions are unknown, and no provisions were made in the dam for relief of uplift pressure, it was assumed that the uplift pressure on the dam base varies from full reservoir head at the upstream face toe to zero at the downstream face toe, and acts on 100 percent of the base.

A summary of the stability analysis results is shown in Appendix E. The criteria for determining whether the dam is stable or not are:

1. No tension should exist anywhere in the dam; i.e., the resultant of all forces on the dam should fall within the middle third of the base (paragraph 4.4.4.4 of Reference 7).

2. The factor of safety against sliding should be approximately 3 or more (paragraph 4.4.4.5.2 of Reference 7).

Table E-1 of Appendix E shows that the spillway section does not meet these criteria for Conditions A and B, because tension exists along the base of the dam and the resultant of forces intersects the base line beyond the downstream toe of the spillway.

Table E-2 of Appendix E shows that the concrete gravity dam section also does not meet the overturning criteria for Conditions A and B.

It is pertinent to note that the safety factors against sliding for the dam sections analyzed are above the screening criteria established by the U.S. Corps of Engineers (Reference 7) for all the loading conditions considered. (See page 15.)

It should be noted that in calculating the factors of safety against overturning and sliding a one foot wide area was considered at the highest concrete gravity dam and spillway sections. The results of the dam stability calculations are therefore conservative because side resisting forces were not taken into account.

The stability analysis for the earthen dam section cannot be evaluated due to inadequate information.

7.0 ASSESSMENT/REMEDIAL MEASURES

The assessment and remedial measures contained herein are based on the provisions of Appendix J, Conditions.

7.1 DAM ASSESSMENT

7.1.1 Safety: On the basis of GAI's visual field inspection and available data, the concrete gravity and earth embankment sections appear to be in poor condition as discussed in paragraph 3.2. No major critical signs of distress were discovered during the visual inspection. The overtopping of the concrete section will continue to occur with the present spillway design.

7.1.2 Adequacy of Information: Information for assessing the performance of the dam is not adequate. Documented data on the source of peat moss, frequency of overtopping of the dam and damage history were not available.

7.1.3 Urgency: The field investigation and analysis recommended should be initiated immediately by the owner.

7.1.4 Necessity for Further Studies: In order to determine the safety of the dam including the "piping" potential and phreatic condition of the earth embankment section at high water level, additional subsurface investigations will be needed, in accordance with section 4.4 of Reference 7.

7.2 REMEDIAL MEASURES

7.2.1 Recommendations: The following are the recommendations resulting from the field inspection and the analysis of the data available to Gilbert Associates, Inc.:

1. A subsurface investigation and laboratory testing program should be conducted for the earth embankment and concrete gravity section, including the installation of piezometers to periodically monitor the integrity of the core wall.

2. An analysis should be made of the phreatic conditions in the downstream section of the earth embankment to determine piping potential.

3. A complete stability analysis should be made using data obtained from 1 and 2 to determine the actual static and seismic stability of the concrete gravity and the embankment sections.

4. The dam stability should be increased possibly through the installation of rock-bolt anchors and other additional modifications such as drainholes, etc. if required.

5. All trees on the earth embankment that die, fall over, etc. should be removed immediately thereafter along with stumps, roots and peat moss down to the original ground, and the holes be backfilled with impervious soil in properly compacted layers. The backfilled area should be grass-seeded, and periodically inspected to prevent new tree growth.

6. Structural cracks and cracks in the cement-mortar cover of the concrete gravity section be further investigated and repaired soon.

7. The eroded areas along the downstream toe of the concrete gravity sections be refilled in the near future with materials and procedures approved by a qualified engineer.

8. The corroded nuts and bolts on the bonnets of the 16 inch valves be replaced in the near future.

9. The support of the last section of the 48-inch reinforced-concrete pipe should be repaired soon.

7.2.2 Alternatives: An alternative action to recommendation 5 of paragraph 7.2.1 would be the removal of all the trees, including stumps, root mat and peat moss from the downstream and upstream slopes of the earth embankment. Afterwards, the downstream slopes should be reshaped in accordance with originally designed slopes, and grass-seeded. Execution of this alternative recommendation would require the reconstruction of the earth dam due to the excessive growth and sizes of the trees along the embankment.

7.2.3 Operations/Maintenance

As part of operations the rusted nuts and bolts of the bonnets of the 16 inch valves in the valve pit should be replaced with stainless steel due to the acidic nature of the lake water.

All cracks, fractures and spalling in the concrete gravity section should be properly prepared and repaired with epoxy grout and epoxy cement mixes.

The last section of 48 inch RCP from the valve pit should be properly supported before it topples into the discharge channel.

After each overtopping of the concrete gravity section the toe should be checked for erosion, and if necessary granular fill added after cleaning out all organic matter.

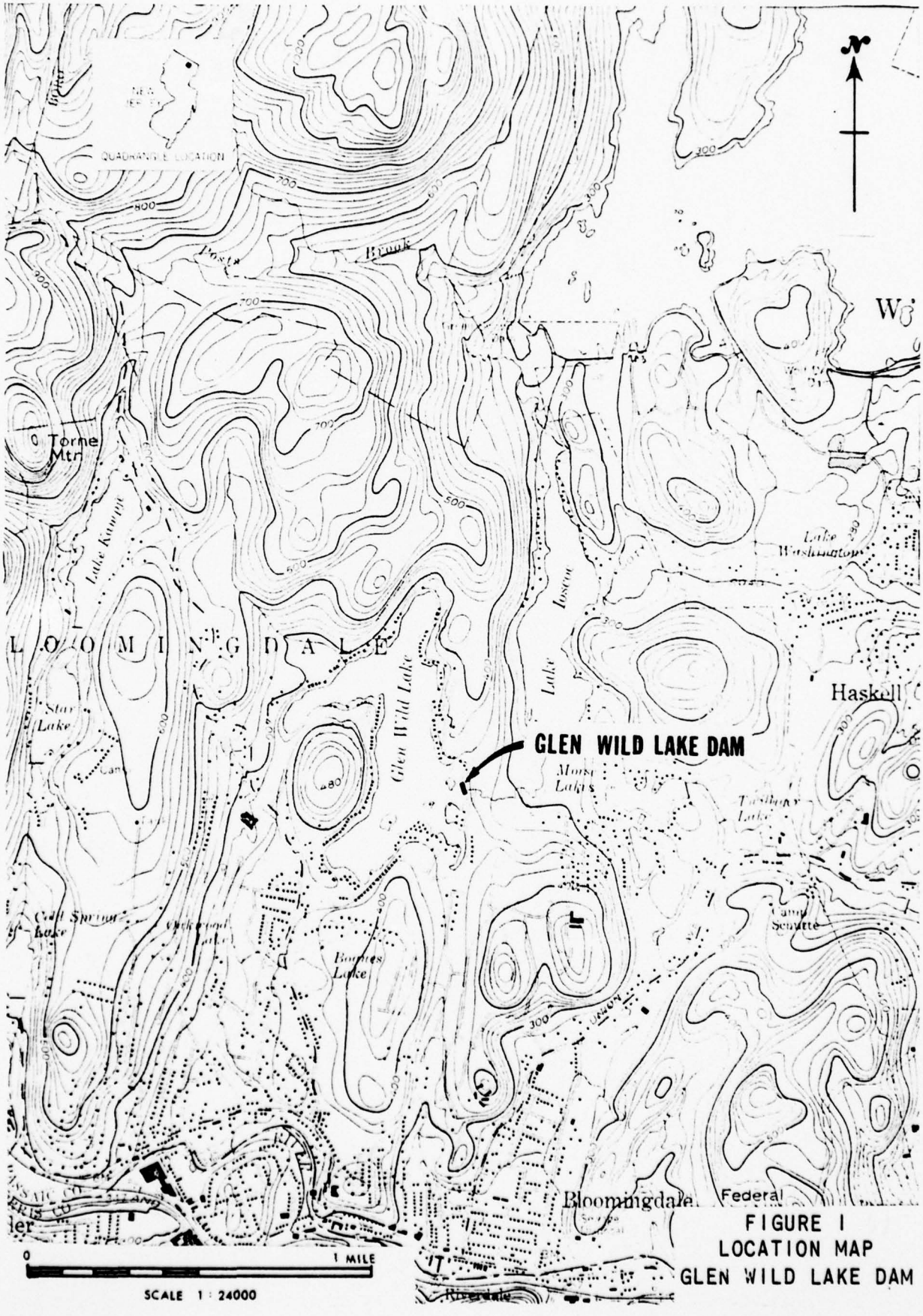
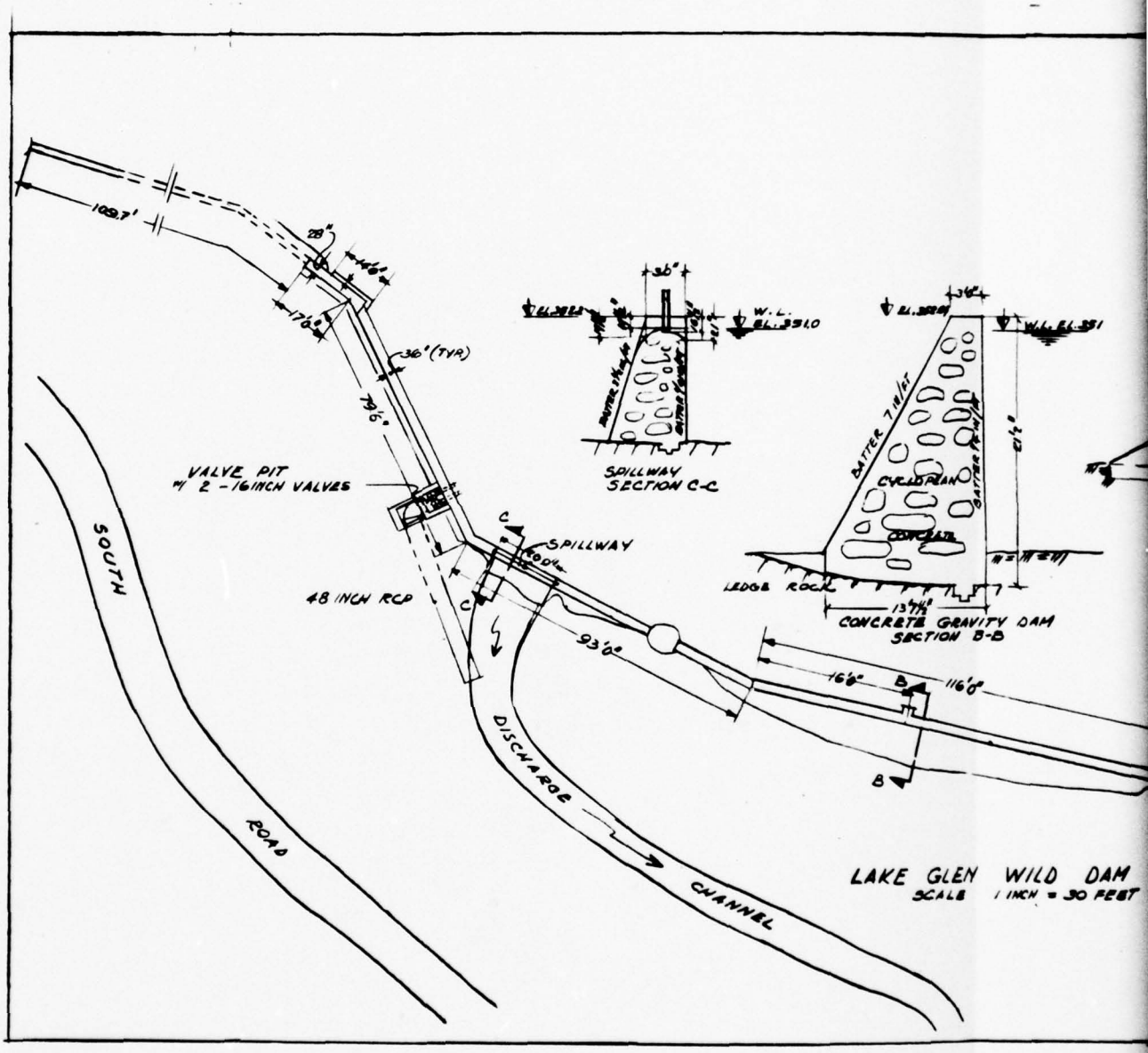


FIGURE 1
LOCATION MAP
GLEN WILD LAKE DAM


109.7'
28°
44.6'
17.6'
36" (TYP.)
79.6'
VALVE PIT
W/ 2 - 16 INCH VALVES
SOUTH
ROAD
48 INCH RCP
C
SPILLWAY
60.4'
C
93.0'
DISCHARGE
CHANNEL
36"
EL. 3324
W.L. EL. 3310
SPILLWAY
SECTION C-C
36"
EL. 3324
W.L. EL. 331
BATTER 7 IN/FT
CYCLOPEAN
CONCRETE
EL. 3111
LEDGE ROCK
137.5'
CONCRETE GRAVITY DAM
SECTION B-B
16.6'
B
116.0'
B
LAKE GLEN WILD DAM
SCALE 1 INCH = 30 FEET

1

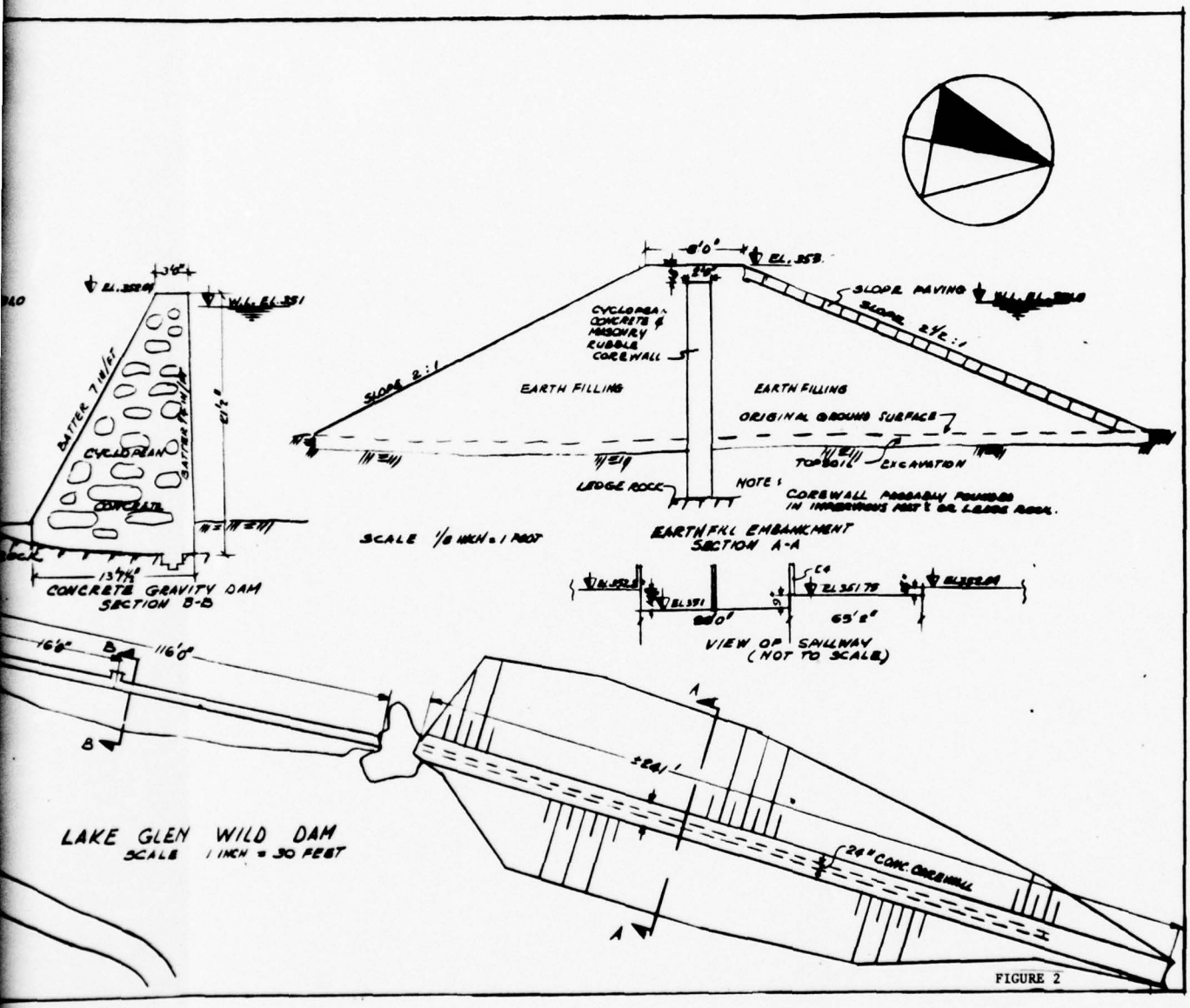
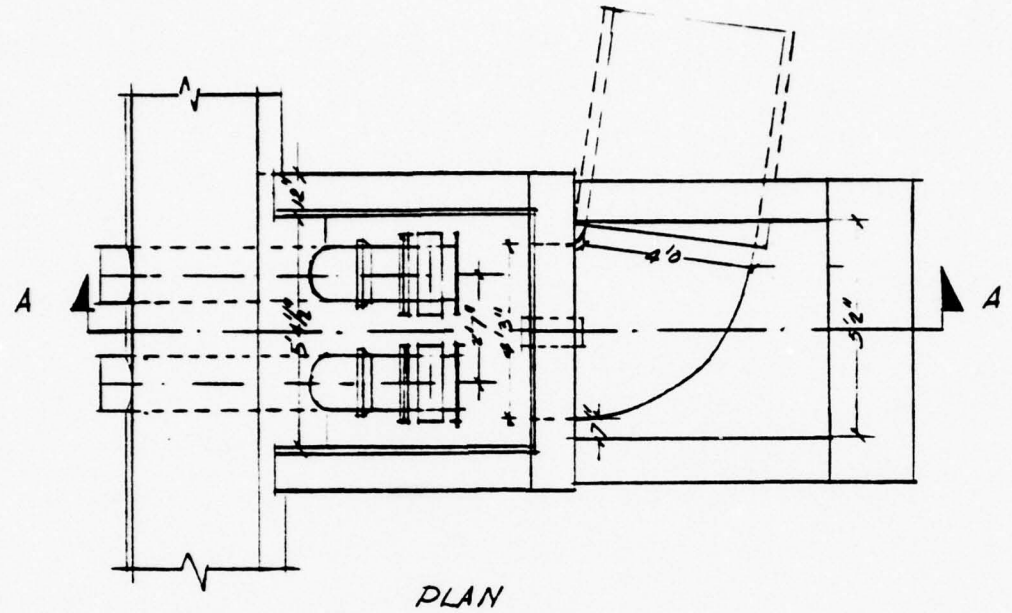
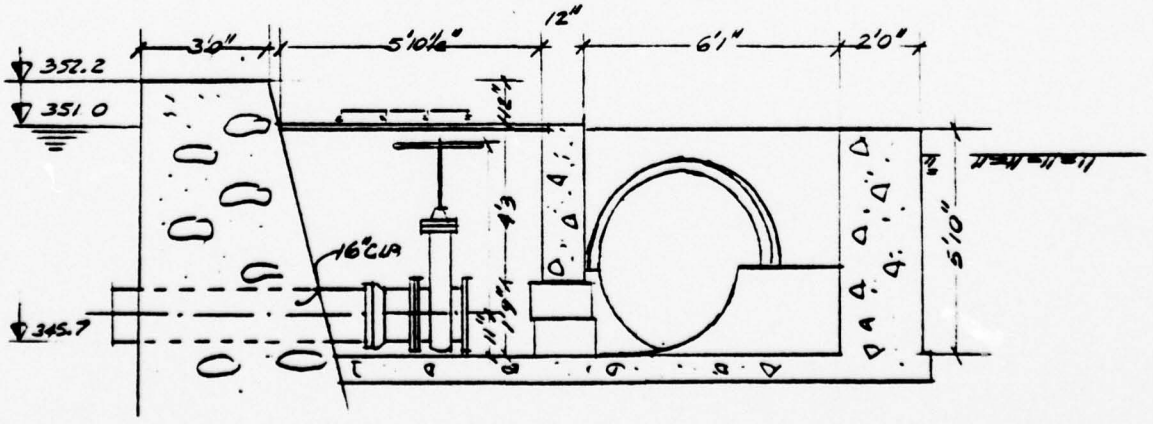

EL. 358
SLOPE PAVING
SLOPE 2½:1
CYCLOPEAN CONCRETE & MASONRY RUBBLE CORE WALL
SLOPE 2:1
EARTH FILLING
EARTH FILLING
ORIGINAL GROUND SURFACE
TOPSOIL
EXCAVATION
LEDGE ROCK
NOTE: CORE WALL PROBABLY FOUNDED IN IMPERVIOUS FILL & OR LEDGE ROCK.
EARTHFILL EMBANKMENT SECTION A-A
SCALE 1/8 INCH = 1 FOOT
W.L. EL. 351
BATTER 7 IN/FT
CYCLOPEAN CONCRETE
CONCRETE
CONCRETE GRAVITY DAM SECTION B-B
EL. 351
65'0"
VIEW OF SPILLWAY (NOT TO SCALE)
116'0"
24" CONC. CORE WALL
LAKE GLEN WILD DAM
SCALE 1 INCH = 30 FEET

FIGURE 2



PLAN



SECTION A-A

GLEN WILD LAKE DAM
DETAILS - VALVE PIT
¼ INCH = 1 FOOT

FIGURE 3

APPENDIX A

VISUAL CHECK LIST

Check List
Visual Inspection
Phase 1

Name Dam: Glen Wild Lake Dam County: Passaic State: New Jersey Coordinators: Phila. District Corps of Engineers

Date(s) Inspection: May 25, 1978 Weather: Cloudy/Bright Temperature: 78°

Pool Elevation at Time of Inspection: approximately 351.25 M.S.L. Tailwater at Time of Inspection approximately 341.25 M.S.L.

Gilbert Associates, Inc.

Inspection Personnel:

Rudolph J. Wahanik

Fine T. Hsu

Rudy P. Visser

Glen Wild Lake Environmental Committee

William B. Park, Jr.

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SEEPAGE OR LEAKAGE	A small amount of seepage was observed along the fractures in the rocks at the contact of the concrete section of the dam and foundation rocks at the toe near the spillway. Minor seeps were occasionally found on the downstream face of the concrete section.	Control seepages by patching or sealing methods.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	The concrete section is separated from the earth embankment by a rock outcrop. Contact zone in good condition.	
DRAINS	None visible - a 16 inch sluice pipe was originally embedded in the concrete section during construction to conduct the brook through the dam.	
WATER PASSAGES	None.	
FOUNDATION	The foundation rocks of the concrete section as exposed in the toe area are competent medium to coarse grained gneiss with fairly well developed foliation planes striking N12^{o}E to N2^{o}E and dipping 40^{o}S.E. to 61^{o}S.E.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	A continuous crack inclined at 45° about 1/2" wide extends from near the spillway crest to the foundation rock. The crack was dry.	The crack should be patched.
STRUCTURAL CRACKING	A structural crack was found 56 feet south of the north end of the concrete gravity dam. The crack was 1/4 inch wide, and ran across the 3-foot wide top of the dam. No seepage was observed on the downstream side.	
VERTICAL AND HORIZONTAL ALIGNMENT.	Appears to be in normal and good condition.	
MONOLITH JOINTS	None visible; all concrete surfaces have been finished off with a coat of mortar.	
CONSTRUCTION JOINTS	The joint 79.5 ft south of the spillway is cracked. This area has been strengthened. The joints between the 20 ft spillway and the concrete section appear in good condition, no seepage was noticed.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	The downstream embankment slopes vary greatly from 1-1/4 horizontal to 1 vertical to 2-1/2 horizontal to 1 vertical, and are covered with dense growths of trees and shrubs. At the toe of the slopes peat moss deposits in various thicknesses abound (This is leftover peat moss from the lake peat moss mining operations)	The irregularity of the slope probably is the result of the erosion and deposition of debris from the past overtoppings.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	The top of the embankment shows an uneven surface probably caused by differential settlement of the embankment during early stages of its life.	
RIPRAP FAILURES	The riprap visible on the upstream slopes is in good condition and adequately protects the embankment against more erosion and ice damage except where dislodged by trees.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CREST	The top width of the dam varies from 6 ft to 25 ft with average width of 8.5 ft. At 82 ft from the concrete section of the dam, a concrete foundation 6 ft x 2 ft was found level with the top of the crest. The depth of same could not be determined.	The concrete foundation should be removed and the void filled in with clay compacted in 6 inch layers.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	The contacts of embankment and rock abutment, the embankment and the concrete section all appear to be in normal and watertight condition.	
ANY NOTICEABLE SEEPAGE	Some small seepage flows have developed beyond the toe of the embankment.	
STAFF GAGE AND RECORDER	Not applicable	
DRAINS	Not applicable	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	The 48 inch reinforced concrete pipe used to drain the lake level every 5 years appears in good condition; the last section of pipe is in danger of falling into the discharge channel due to loss of support. The gate chamber and mixing chamber are in good condition.	Provide support for pipe section.
INTAKE STRUCTURE	Not applicable	
OUTLET STRUCTURE	A valve pit containing two 16-inch gate valves and cast iron pipes is located approximately 75 feet south of the spillway.	The chamber with the gate valves opens into a connecting chamber with a 48-inch reinforced concrete outlet pipe.
OUTLET CHANNEL	Not applicable	
EMERGENCY GATE	Not applicable	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	The 20 ft concrete spillway appears to be founded on competent rock. A horizontal crack runs from left to right across the face of the spillway, approximately 1/2 ft below the spillway crest. The concrete section to the right of the spillway exhibited some spalling. A pronounced crack located on the south side of the spillway carried no seepage.	This horizontal crack may join the diagonal surface crack found on the downstream face of adjoining concrete dam at the right side (see page A-3). Cracks should be examined for continuity and offset, and repaired.
APPROACH CHANNEL	Not applicable	
DISCHARGE CHANNEL	The boulder and exposed bedrock of the channel invert performs as a natural energy dissipator. The channel shows signs of excessive lateral erosion, and deposits of peat moss. This was probably caused by past overtoppings.	The excessive erosion of the discharge channel and vicinity should be corrected, the channel should be reshaped and paved with riprap on sides and invert.
BRIDGE AND PIERS	Not applicable	
CULVERT	The culvert which carries the discharge water under South Road is made of riveted boiler plate, 5.0 ft in diameter and appears in good condition.	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Not applicable	
APPROACH CHANNEL	Not applicable	
DISCHARGE CHANNEL	Not applicable	
BRIDGE AND PIERS	Not applicable	
GATES AND OPERATION EQUIPMENT	Not applicable	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed	
OBSERVATION WELLS	None observed	
WEIRS	None observed	
PIEZOMETERS	None observed	
OTHER	None observed	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	The reservoir slopes range from gentle to steep where rock bluffs exist. The slopes were apparently stable.	
SEDIMENTATION	Although the lakewater was not crystal clear, had a slight odor, and a pH of 6.8, (according to Mr. Park, Jr.) the sediments being transported into the lake from the entrance ravine are being deposited at a very slow rate due to the generally dense wooded headwaters.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Generally shallow, boulder strewn streambed to Lake Iosco, 1/2 mile away	
SLOPES	Steep, nearly vertical due to excessive flows during dam overtoppings.	
APPROXIMATE NO. OF HOMES AND POPULATION	At least one home as shown in USGS Quadrangle Sheet.	

APPENDIX B

ENGINEERING DATA CHECKLIST

Check List
Engineering Data
Design, Construction, Operation

Item	Remarks
PLAN OF DAM	Microfilm - Dated October 9, 1917 by William H. Boardman, Consulting Engineer
REGIONAL VICINITY MAP	U.S.G.S. 7 1/2 min. - Wanaque Quadrangle, photo revised 1971.
CONSTRUCTION HISTORY	Very sketchy, on microfilm, at N. J. Dept. of Envir. Protection.
TYPICAL SECTIONS OF DAM	Microfilm
HYDROLOGIC/HYDRAULIC DATA	None
OUTLETS - PLAN	None
- DETAILS	None
- CONSTRAINTS	Not Applicable
- DISCHARGE RATINGS	Not Applicable
RAINFALL/RESERVOIR RECORDS	No reservoir records.
DESIGN REPORTS	Report by State of N. J. dated October 31, 1917.
GEOLOGY REPORTS	None available. Part of foundation was inspected by State of New Jersey and reported as being satisfactory.
DESIGN COMPUTATIONS	None available.
HYDROLOGY & HYDRAULICS	None available.

Item	Remarks
DAM STABILITY	None (The concrete section was S.F. = 2.5 against overturning, see Report October 31, 1917)
SEEPAGE STUDIES	None available.
MATERIALS INVESTIGATIONS	None available.
BORING RECORDS	None, (plan of dam shows the location of 3 test pits excavated down to rock surface)
LABORATORY	None available.
FIELD	None available.
POST-CONSTRUCTION SURVEYS OF DAM	None available.
BORROW SOURCES	None available.
SPILLWAY PLAN	See Design Drawing available at N. J. DEP and Figure 3.
SECTIONS	See Design Drawing available at N. J. DEP and Figure 3.
DETAILS	See Design Drawing available at N. J. DEP and Figure 3.
OPERATING EQUIPMENT	None available, sketch based on field measurements.
PLANS & DETAILS	None available, sketch based on field measurements.
MONITORING SYSTEMS	None observed
MODIFICATIONS	Not known
HIGH POOL RECORDS	Not available
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Not available, only inspection reports (see Appendix E).

Item	Remarks
PRIOR ACCIDENTS OR FAILURE OF DAM	Not applicable
DESCRIPTION	Not applicable
REPORTS	Not applicable
MAINTENANCE	Not applicable
OPERATION	
RECORDS	

Check List

Engineering Data
Hydrologic and Hydraulic Data

Drainage area characteristics: Lightly forested, several homes built around the reservoir, very hilly.

Elevation top normal pool (storage capacity) 351 ft (2982 Acre-ft)
Elevation top flood control pool (storage capacity) Not applicable
Elevation maximum spillway SDF pool: PMF = 354.1 ft
Elevation top of dam: 353.00 ft.

Crest earth dam

a. Elevation - 353.00
b. Type - Compacted earth fill with concrete core wall
c. Width - 8.00 ft.
d. Length - 241 ft.
e. Location spillover - along concrete gravity dam.
f. Number and type of gates: Not applicable.

Crest concrete gravity dam

a. Elevation of various levels:
   Cutoff wall - approximately 110 ft long at elevation 352.2
   Dam - 104-foot long at elevation 352.2
   - 116 foot long at elevation 352.04
   - 65 foot long at elevation 351.75
   - 20 ft long at elevation 351.0
b. Type - broad crested
c. Width - 3 feet, and 1.5 feet for cutoff wall.
d. Length - 305.00 feet and 110 feet for cutoff wall.
e. Location spillover center portion of gravity section, see Figure .
f. Number and type of gates: Not applicable.

Emergency outlet works

a. Type: Two 16 inch diameter gate valves at the end of two 16 inch diameter cast iron pipes.
   Location - along the wall of the concrete gravity dam
   Entrance inverts - 345.75
   Exit inverts - 345.70

Hydrometeorological gages

Not applicable.

Maximum non damaging discharge: 1190 cfs

APPENDIX C

PHOTOGRAPHS

May 1978

VIEW OF GRAVITY SECTION LOOKING
TOWARDS EARTH EMBANKMENT

SLOPE PROTECTION OF
EARTH EMBANKMENT

May 1978

May 1978

SPILLWAY WITH ONE FLASHBOARD

RIGHT SPILLWAY ABUTMENT

May 1978

May 1978

EARTH EMBANKMENT LOOKING NORTH

May 1978

EARTH EMBANKMENT LOOKING NORTH

APPENDIX D

HYDRAULIC COMPUTATIONS

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: COE

PROJECT: NJ DAM INSPECTIONS

FILING CODE

W.O. 06-7249-000 PAGE 1 of

SYSTEM: GLEN WILD LAKE

ORIGINATOR: R.A. Smith
DATE: 8-28-78

CALCULATION FOR: HYDROLOGY

REVIEWER: D. Veil
DATE: 8-28-78

RESULTS

A) DRAINAGE AREA

FROM USGS WANAQUE, N.J., QUAD SHEET -

AREA = 7.22 SQUARE INCHES
⇒ 1.04 SQUARE MILES
= 663 ACRES

B) TIME OF CONCENTRATION

1) OVERLAND FLOW -
DISTANCE = 2200 FT
ΔH = 750 - 550 = 200 FT
SLOPE = 0.09 FT/FT
MANNING n FOR WOODED OVERLAND FLOW = 0.25
MAXIMUM DEPTH OF FLOW ≈ 6" = 0.5 FT

USING MANNING FORMULA FOR WIDE CHANNEL-

$$V = \frac{1.49}{0.25}(0.5)^{2/3}(0.09)^{1/2} = 1.1 \text{ FPS}$$

TIME = 2200/1.1/60 = 33 MINUTES

2) STREAM FLOW -
DISTANCE = 4400 FT ΔH = 550 - 350
SLOPE = 0.045 = 200 FT
VEL = 3.5 FPS
TIME = 4400/3.5/60 = 21 MINUTES

FILING CODE

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT COE

PROJECT NJ DAM INSPECTIONS

FILING CODE

W.O. PAGE 2 OF

SYSTEM GLEN WILD DAM

ORIGINATOR R.A. Pratt
DATE 8-28-78

CALCULATION FOR HYDROLOGY

REVIEWER D. Veil
DATE 8.30.78

RESULTS

TOTAL T_c = 54 MINUTES

c) TRIANGULAR UNIT HYDROGRAPH -

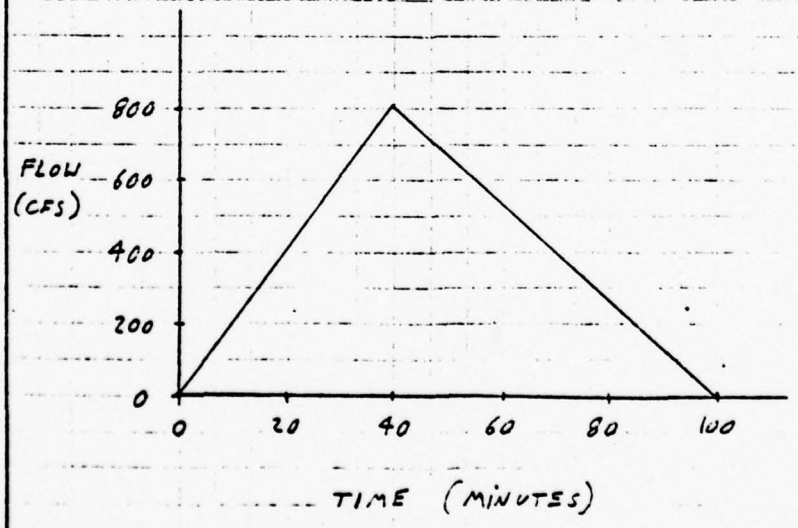
$\Delta D \approx 0.133\, T_c = 7.2 \Rightarrow$ 10 MINUTES

$T_p = \frac{\Delta D}{2} + 0.6 T_c = 5 + 32.4 = 37.4$

USE 40 MINUTES

$T_b = 2.67\, T_p = (2.67)(37.4) = 100$ MINUTES

$q_p = \frac{484\, A}{T_p} = \frac{(484)(1.04)}{0.625} = 805$ CFS



FILING CODE

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: Corps. of Eng.
PROJECT: N.J. DAM INSPECTIONS
FILING CODE:
W.O.:
PAGE: 3 OF

SYSTEM: GLEN WILD LAKE
ORIGINATOR: R.A.PUTT PRK
DATE: 5-24-78
CALCULATION FOR: HYDROLOGY
REVIEWER: J.M. NORMANN PRK
DATE: 7-26-78
RESULTS

HEC - 1 UNIT HYDROGRAPH ORDINATES

TIME (MINUTES)	FLOW (CFS)
10	201
20	403
30	604
40	805
50	671
60	537
70	403
80	268
90	134
100	0

D) LOSS RATES

MOST OF THE DRAINAGE AREA IS IN THE ROCKAWAY - ROCK OUTCROP SERIES. AGAIN USE :

INITIAL RAINFALL LOSS = 1.0 INCH
UNIFORM RAIN FALL LOSS = 0.15 IN/HR

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PROJECT: N.J. DAM INSPECTIONS
FILING CODE:
W.O.:
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SYSTEM: GLEN WILD LAKE
ORIGINATOR: R.A. PUTT PRR
DATE: 5-24-78

CALCULATION FOR: PROBABLE MAXIMUM PRECIPITATION
REVIEWER: J.M. NORMANN PRR
DATE: 7-28-78

RESULTS

HYDROMETEOROLOGICAL REPORT NO. 33

DRAINAGE AREAS OF THE 4 SMALL DAMS ARE LESS THAN 10 SQUARE MILES, SO VALUES FOR 10 SQUARE MILES ARE TO BE USED.

LOCATION IS ON THE ZONE 1 - ZONE 6 BOUNDARY SO THE VALUES FROM THE TWO REGIONS SHOULD BE AVERAGED.

THE 200 SQUARE MILE - 24 HOUR PMP = INDEX PMP = 22.1 INCHES

PERCENT OF INDEX PMP

DURATION (HOURS)	ZONE 1 %	ZONE 6 %	AVE. %	PMP (INCHES)
6	111	113	112	24.8
12	123	123	123	27.2
24	133	132	132	29.2
48	142	142	142	31.4

TIME DISTRIBUTION

TIME (MIN.)	PPT (IN.)	TIME (MIN.)	PPT (IN.)
10	0.06	70	0.06
20	0.06	80	0.06
30	0.06	90	0.06
40	0.06	100	0.06
50	0.06	110	0.06
60	0.06	120	0.06

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	PROJECT: N. J. DAM INSPECTIONS	W.O. / PAGE: 5 OF
SYSTEM: GLEN WILD LAKE		ORIGINATOR: R.A. PUTT PRR DATE: 5-24-78
CALCULATION FOR: HYDROLOGY		REVIEWER: J.M. NORMANN PRR DATE: 7-28-78
		RESULTS

TIME (MIN.)	PPT (IN.)	TIME (MIN.)	PPT (IN.)
130	0.19	430	0.88
140	0.19	440	1.05
150	0.19	450	1.31
160	0.19	460	3.33
170	0.19	470	1.23
180	0.19	480	0.96
190	0.19	490	0.54
200	0.19	500	0.54
210	0.19	510	0.54
220	0.19	520	0.54
230	0.19	530	0.54
240	0.19	540	0.54
250	0.38	550	0.42
260	0.38	560	0.42
270	0.38	570	0.42
280	0.38	580	0.42
290	0.38	590	0.42
300	0.38	600	0.42
310	0.47	610	0.09
320	0.47	620	0.09
330	0.47	630	0.09
340	0.47	640	0.09
350	0.47	650	0.09
360	0.47	660	0.09
370	0.58	670	0.09
380	0.58	680	0.09
390	0.58	690	0.09
400	0.58	700	0.09
410	0.58	710	0.09
420	0.58	720	0.09

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CLIENT: Corps of Eng.
PROJECT: N.J. DAM INSPECTIONS
FILING CODE:
W.O.:
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SYSTEM: GLEN WILD LAKE
ORIGINATOR: R.A. PUTT PRR
DATE: 5-24-78
CALCULATION FOR: HYDROLOGY
REVIEWER: J.M. NORMANN PRR
DATE: 7-26-78
RESULTS:

E) LAKE AREA

POOL AREA = 1.15 PLANIMETER UNITS
= 0.165 SQUARE MILES

THIS IS A SIGNIFICANT PORTION OF THE TOTAL DRAINAGE AREA, ABOUT 16%. THIS CAN BEST BE REPRESENTED IN THIS SIMPLIFIED HEC-1 ANALYSIS AS THE IMPERVIOUS PORTION OF THE DRAINAGE BASIN.

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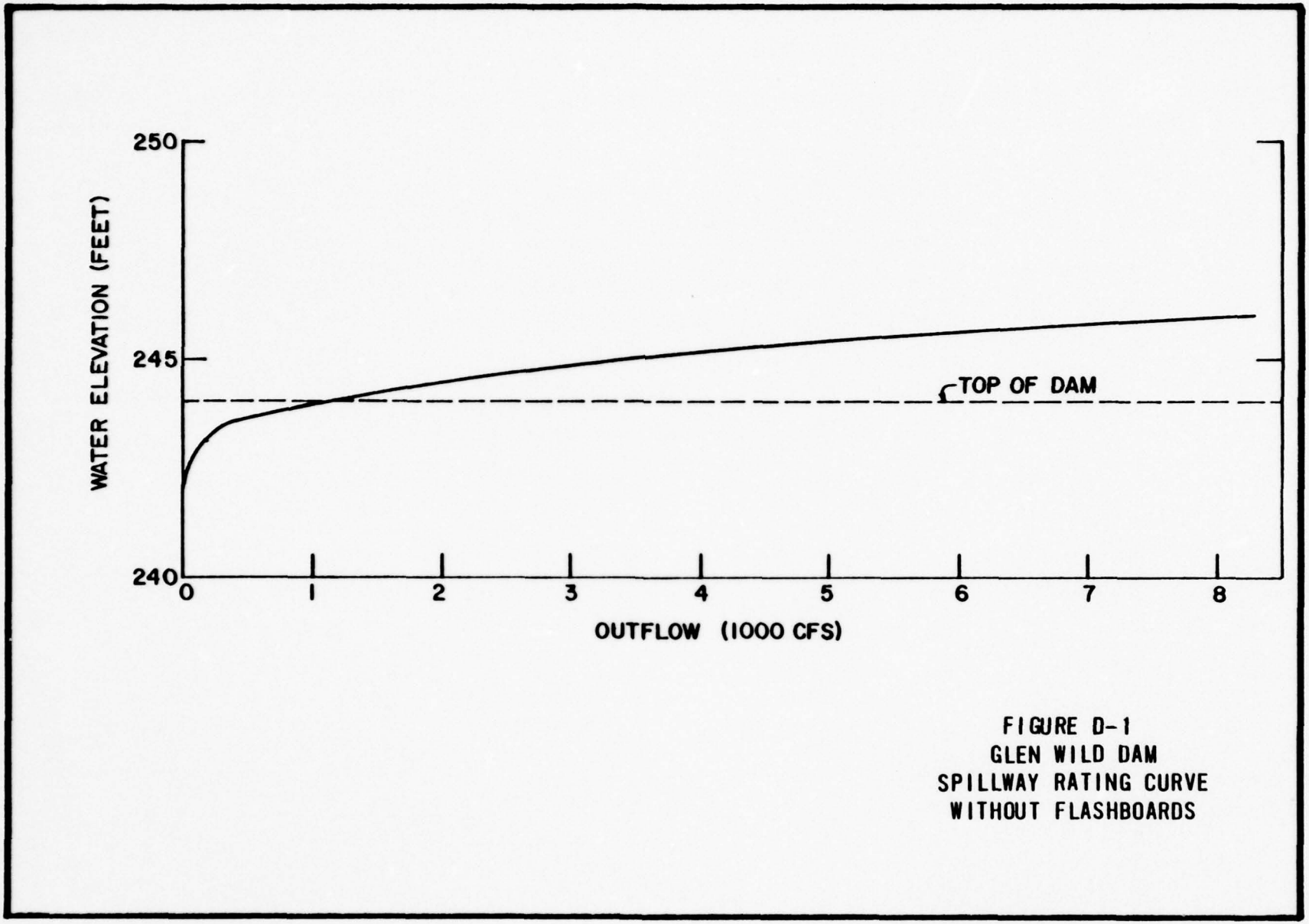

FIGURE D-1
GLEN WILD DAM
SPILLWAY RATING CURVE
WITHOUT FLASHBOARDS

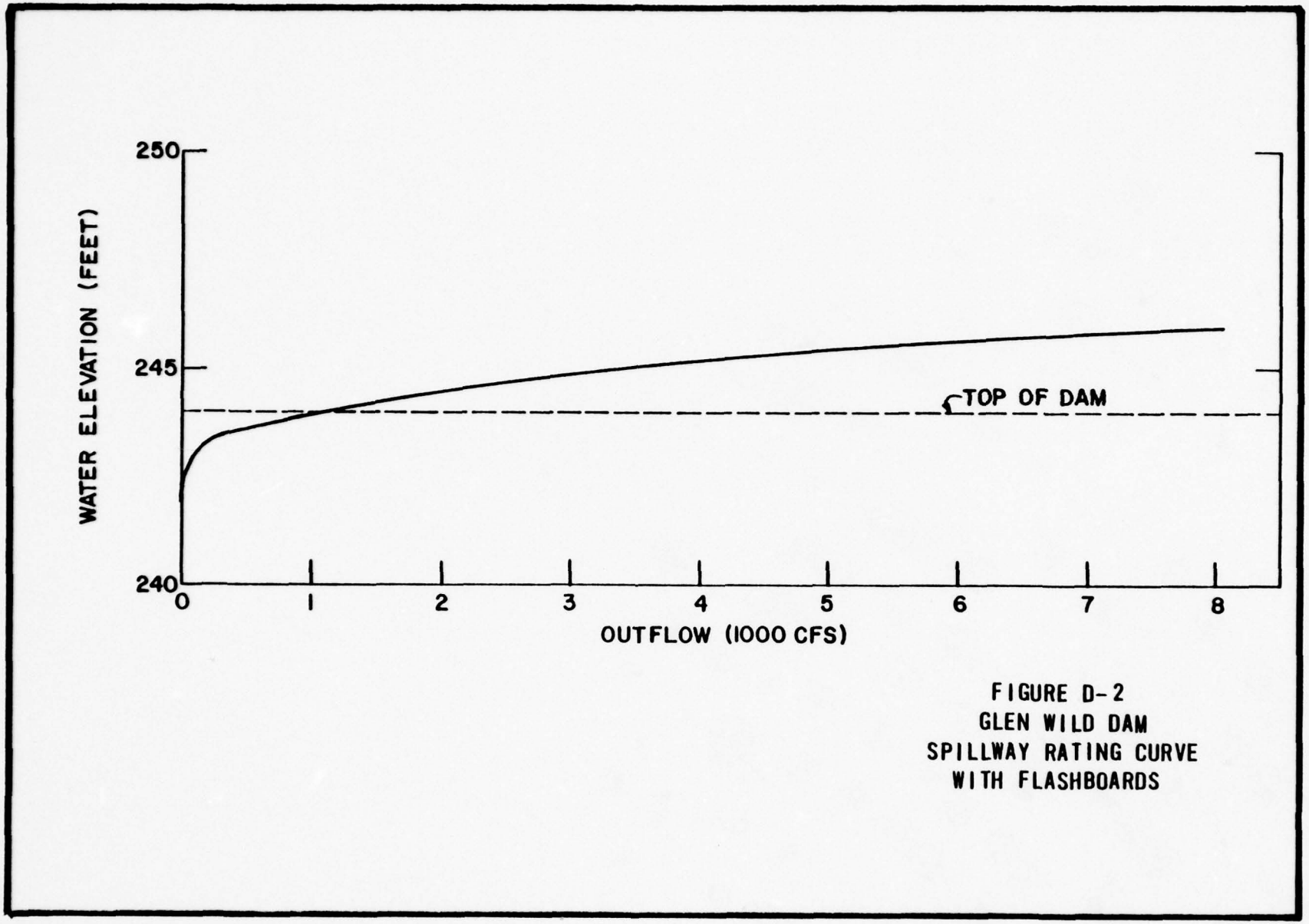

FIGURE D-2
GLEN WILD DAM
SPILLWAY RATING CURVE
WITH FLASHBOARDS

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CLIENT: Corps of Eng.
PROJECT: N.J. DAM INSPECTIONS

FILING CODE
W.O.
PAGE 7 OF

SYSTEM: GLEN WILD LAKE

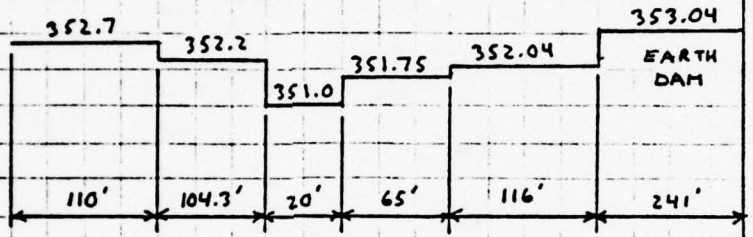
ORIGINATOR: R.A. PUTT PRR
DATE: 7-31-79

CALCULATION FOR: HYDRAULICS

REVIEWER: [illegible]
DATE: 8.1.79

RESULTS

SKETCH OF DAM - NOT TO SCALE



THE RESERVOIR SURFACE AREA IS 175 ACRES, INCREASES SLIGHTLY TO 195 ACRES IN 4-FT. ELEVATION CHANGE.

SPILLWAY IS AN OGEE CREST, INSTALLATION OF FLASH BOARDS RAISE THE CREST ELEVATION TO 351.6'.

THE REST OF THE CONCRETE DAM HAS A TOP BREADTH OF 3.0 FEET AND FUNCTIONS AS A BROAD-CRESTED WEIR.

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PROJECT: N.J. DAM INSPECTIONS
FILING CODE:
W.O.:
PAGE: 8 OF
SYSTEM: GLEN WILD LAKE
ORIGINATOR: R.A. PUTT RAP
DATE: 7-11-78
CALCULATION FOR: HYDRAULICS
REVIEWER: [illegible]
DATE: 8.1.78
RESULTS

FLOW OVER 104.3' SECTION

ELEVATION (FEET)	H (FEET)	C	Q (CFS)
351.0	—	—	—
351.4	—	—	—
351.75	—	—	—
352.04	—	—	—
352.2	0	—	0
352.7	0.5	2.63	100
353.04	0.84	2.67	210
353.5	1.3	2.64	410
354.0	1.8	2.68	680
355.0	2.8	2.89	1410

FLOW OVER 110' SECTION

ELEVATION (FEET)	H (FEET)	C	Q (CFS)
351.0	—	—	—
351.4	—	—	—
351.75	—	—	—
352.04	—	—	—
352.2	—	—	—
352.7	0	—	0
353.04	0.34	2	44
353.5	0.8	2	160
354.0	1.3	2	330
355.0	2.3	2	770

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CLIENT: Corps. of Eng.
PROJECT: N. J. DAM INSPECTIONS
SYSTEM: GLEN WILD LAKE
CALCULATION FOR: HYDRAULICS

FILING CODE
W.O.
PAGE 9 OF
ORIGINATOR R.A. PUTT PRR
DATE 7-31-78
REVIEWER
DATE 8.1.78
RESULTS

FLOW OVER 65' SECTION

ELEVATION (FEET)	H (FEET)	C	Q (CFS)
351.0	—	—	—
351.4	—	—	—
351.75	0	-	0
352.04	0.29	2.50	25
352.2	0.45	2.60	51
352.7	0.95	2.65	160
353.04	1.29	2.64	250
353.5	1.75	2.68	400
354.0	2.25	2.76	610
355.0	3.25	2.94	1120

FLOW OVER 116' SECTION

ELEVATION (FEET)	H (FEET)	C	Q (CFS)
351.0	—	—	—
351.4	—	—	—
351.75	—	—	—
352.04	0	—	0
352.2	0.16	2.44	18
352.7	0.66	2.68	170
353.04	1.00	2.65	310
353.5	1.46	2.65	540
354.0	1.96	2.71	860
355.0	2.96	2.92	1720

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	PROJECT N.J. DAM INSPECTIONS	W.O. / PAGE 10 OF
SYSTEM GLEN WILD LAKE		ORIGINATOR R.A.PITT PRL DATE 7-31-78
CALCULATION FOR HYDRAULICS		REVIEWER J.D.Neel DATE 8.1.78

RESULTS

FLOW OVER 24.1' EARTH DAM

ELEVATION (FEET)	H (FEET)	C	Q (CFS)
351.0	—	—	—
351.4	—	—	—
351.75	—	—	—
352.04	—	—	—
352.2	—	—	—
352.7	—	—	—
353.04	0	—	0
353.5	0.46	2.95	220
354.0	0.96	3.40	770
355.0	1.96	3.56	2350

FLOW OVER SPILLWAY WITHOUT FLASH BOARDS 20'L

ELEVATION (FEET)	H (FEET)	C	Q (CFS)
351.0	0	—	0
351.4	0.4	3.95	20
351.75	0.75	3.95	51
352.04	1.04	3.95	84
352.2	1.2	3.95	104
352.7	1.7	3.95	180
353.04	2.04	3.95	230
353.5	2.5	3.95	310
354.0	3.0	3.95	410
355.0	4.0	3.94	630

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PROJECT: N.J. DAM INSPECTIONS

FILING CODE

W.O.

PAGE 11 OF

SYSTEM: GLEN WILD LAKE

ORIGINATOR: R.A. PUTT PAR

DATE: 7-31-78

CALCULATION FOR: HYDRAULICS

REVIEWER: [illegible]

DATE: 8-10-78

RESULTS

REVISED VOLUME - OUTFLOW RELATION
WITHOUT FLASHBOARDS

POOL ELEVATION (FEET)	SURFACE AREA (ACRES)	STORAGE VOLUME (ACRE-FEET)	OUTFLOW (CFS)
351.0	175	0	0
351.4	177	70	20
351.75	179	130	51
352.04	180	180	110
352.2	181	210	173
352.7	184	310	610
353.04	185	370	1040
353.5	188	450	2040
354.0	190	550	3660
355.0	195	740	8000

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CLIENT: Corps of Eng.
PROJECT: N.J. DAM INSPECTIONS
FILING CODE:
W.O.:
PAGE: 12 OF
SYSTEM: GLEN WILD LAKE
ORIGINATOR: R.A.PUTT RAR
DATE: 7-31-79
CALCULATION FOR: HYDRAULICS
REVIEWED: R.O. Abel
DATE: 8-1-79

FLOW OVER 20' SPILLWAY WITH FLASH BOARDS

RESULTS

ELEVATION (FEET)	H (FEET)	C	Q (CFS)
351.0	—	—	—
351.6	0	—	0
351.75	0.15	3.28	4
352.04	0.44	3.29	19
352.2	0.6	3.30	31
352.7	1.1	3.33	77
353.04	1.44	3.34	120
353.5	1.9	3.37	180
354.0	2.4	3.39	250
355.0	3.4	3.45	430

REVISED VOLUME - OUTFLOW RELATION WITH FLASH BOARDS

POOL ELEVATION (FEET)	SURFACE AREA (ACRES)	STORAGE VOLUME (ACRE-FEET)	OUTFLOW (CFS)
351.0	175	—	—
351.6	178	0	0
351.75	179	27	4
352.04	180	79	44
352.2	181	108	100
352.7	184	199	510
353.04	185	260	930
353.5	188	350	1910
354.0	190	440	3500
355.0	195	630	7800

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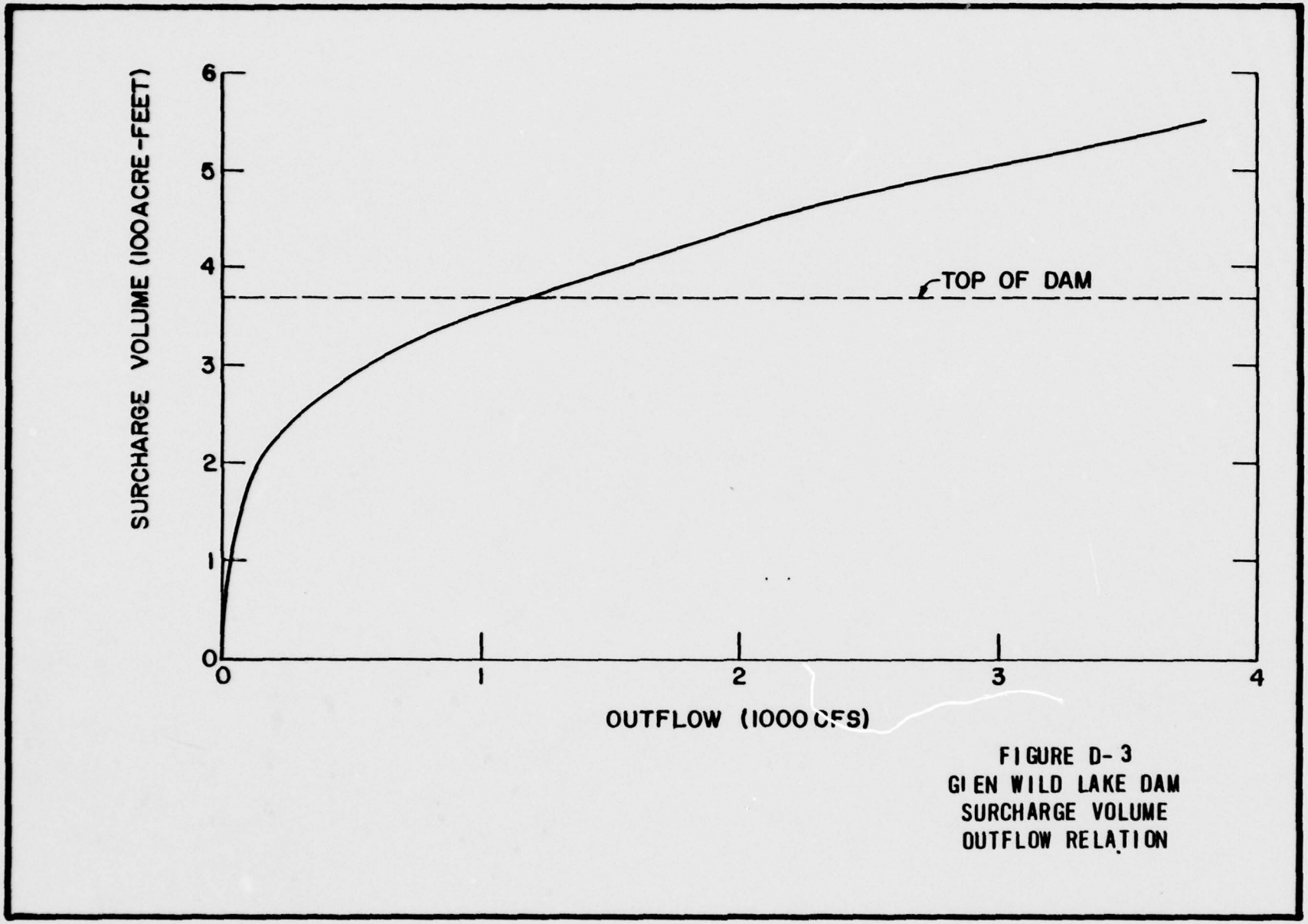

FIGURE D-3
GLEN WILD LAKE DAM
SURCHARGE VOLUME
OUTFLOW RELATION

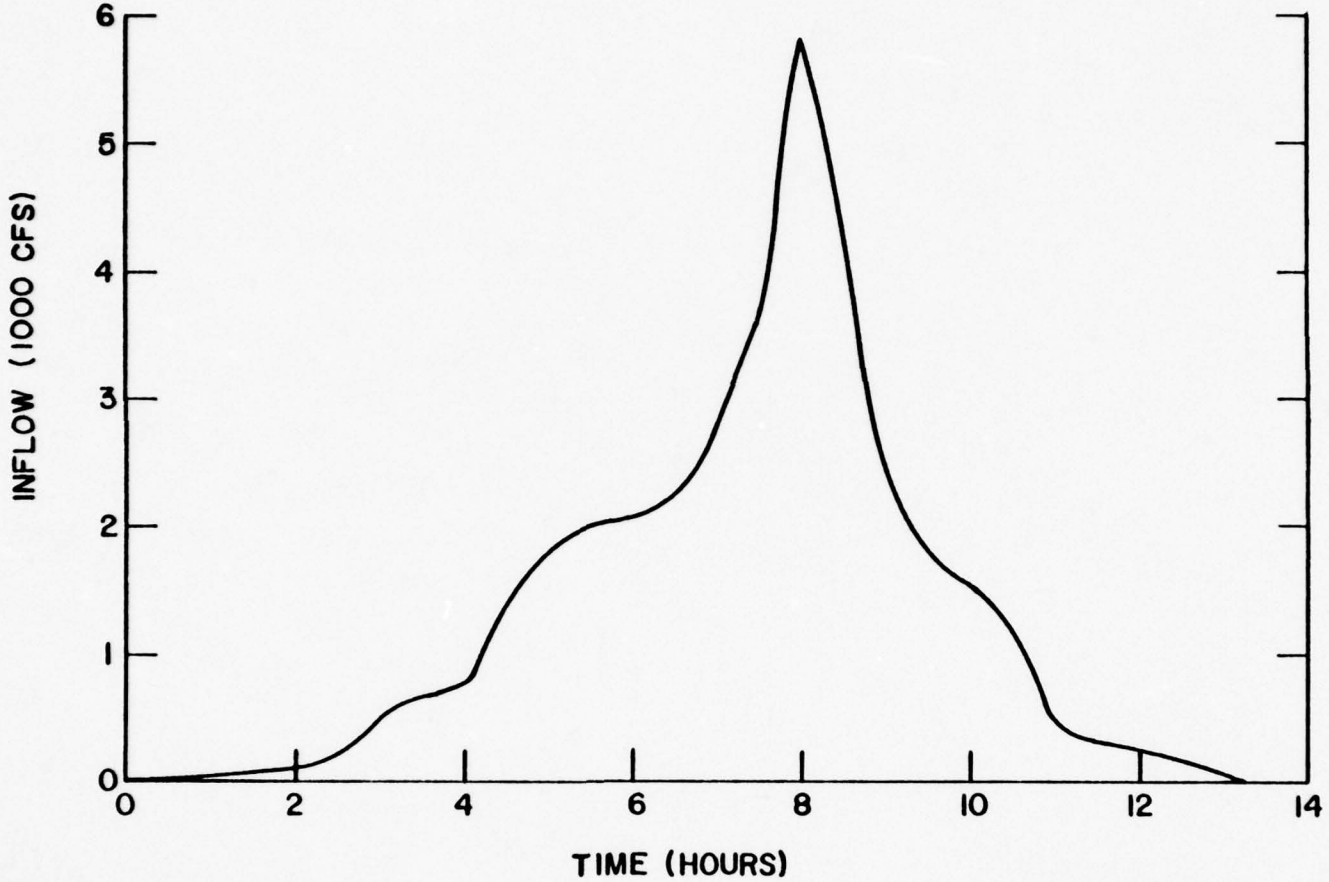

FIGURE D-4
GLEN WILD LAKE DAM
PROBABLE MAXIMUM FLOOD
INFLOW HYDROGRAPH

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ENGINEERS AND CONSULTANTS
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CLIENT: Corps of Eng.
PROJECT: N.J. DAM INSPECTIONS
FILING CODE
W.O.
PAGE 13 OF
SYSTEM: GLEN WILD LAKE
ORIGINATOR: R.A. PUTT PRC
DATE: 7-31-78
CALCULATION FOR: HEC-1 RESULTS
REVIEWED: [illegible]
DATE: 8-1-78
RESULTS

SOME OF THE RESULTS OF HEC-1 RUN TO DETERMINE THE PERCENTAGE OF THE PMF THAT CAN BE SAFELY PASSED.

a) WITHOUT FLASHBOARDS

ITEM	FLOOD HYDROGRAPH		
	0.5 PMF	0.4 PMF	0.3 PMF
PEAK INFLOW (CFS)	2930	2350	1760
RUNOFF VOLUME (AC.-FT.)	697	557	418
PEAK OUTFLOW (CFS)	1500	936	533
PEAK ELEVATION (FT, MSL)	353.2	353.0	352.6
OVERTOPPING EARTH DAM (FT.)	0.2	—	—

b) WITH FLASHBOARDS

ITEM	FLOOD HYDROGRAPH		
	0.5 PMF	0.4 PMF	0.3 PMF
PEAK INFLOW (CFS)	2930	2350	1760
RUNOFF VOLUME (AC-FT.)	697	557	418
PEAK OUTFLOW (CFS)	1730	1260	799
PEAK ELEVATION (FT, MSL)	353.4	353.2	352.9
OVERTOPPING EARTH DAM (FT.)	0.4	0.2	—

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CLIENT COE

PROJECT Dam Inspectim

FILING CODE

W.O. 7249 PAGE 14 OF

SYSTEM Glen Wild Lake

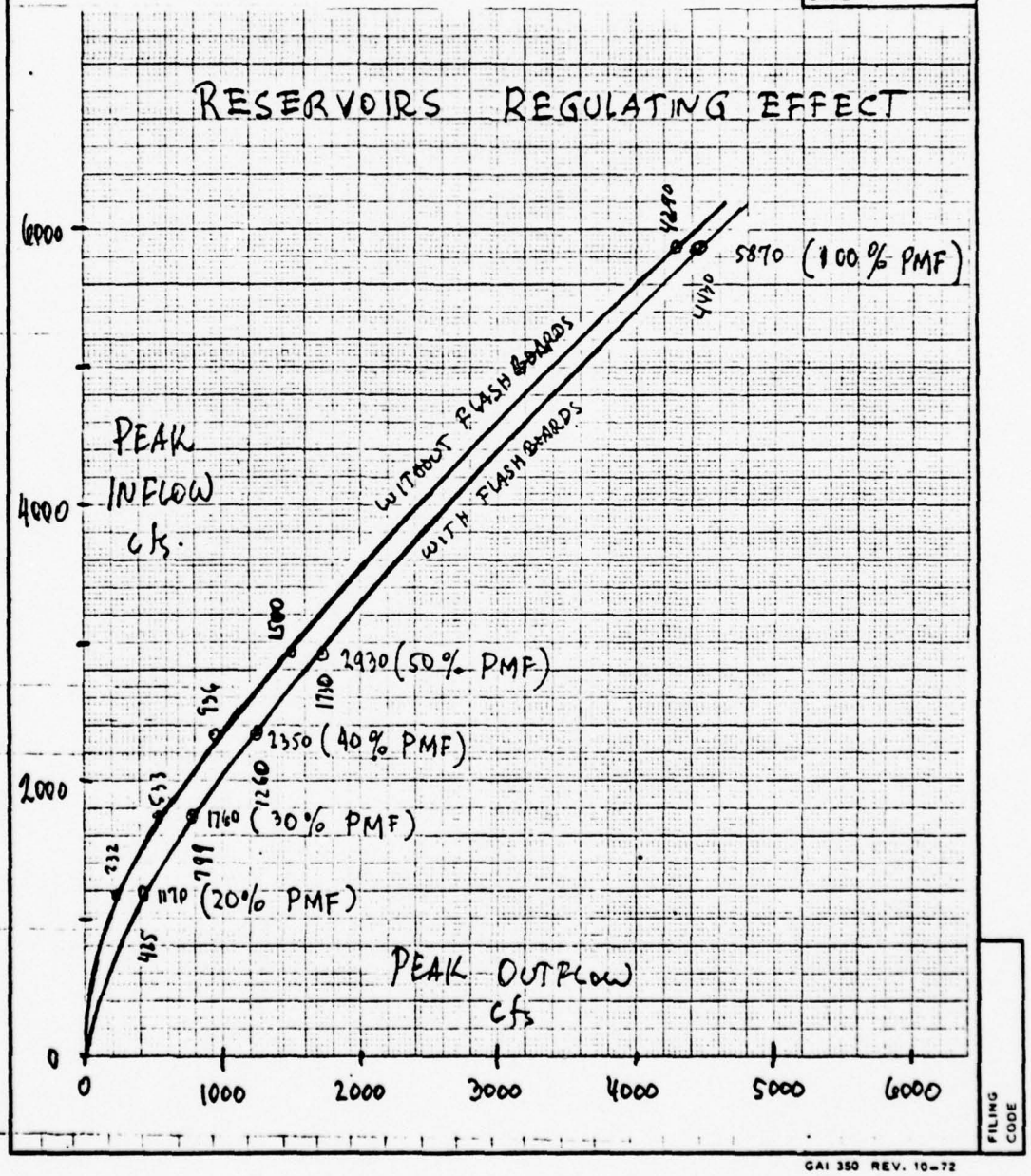
ORIGINATOR R P-H

DATE Jul 27 '72

CALCULATION FOR FLOOD REGULATION

REVIEWER [illegible]

DATE 8 1 72



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GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC. ENGINEERS AND CONSULTANTS READING, PA.	CLIENT C.O.E.	FILING CODE
	PROJECT Dam Inspection	W.O. 7249 PAGE 15 OF
SYSTEM Glen Wild Dam		ORIGINATOR Wahanik DATE 07/16/78
CALCULATION FOR Lake Drawdown		REVIEWED DD Neff DATE 8-1-78
		RESULTS

On July 15, 1978 I talked with Mr. Chuck Jungster (201-838-3294) of the Glen Wild Lake Owners Association, who in the past has performed the drawdown of the Lake 3 times. The reservoir is drained once every three years after Labor Day so that the home owners whose properties are located along the lake's shore can repair and mantein their docks. The next scheduled lake drawdown will be in 1980.

The lake can be drained through two 16 inch diameter pipes controlled by 16 inch diameter gate values with center line at Elevation 346.37

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PROJECT Dam Inspection

FILING CODE

W.O. 7249 PAGE 16 of

SYSTEM Glen Wild Dam

ORIGINATOR Wahrenik
DATE 07/16/78

CALCULATION FOR Lake Drawdown

REVIEWED WOAbel
DATE 8-1-78

RESULTS

The 16 inch dia. pipes discharge into a stilling basin (see drawing in next page) from which the water flows through a 48" inch diameter reinforced concrete pipe to a point located a short distance away from the downstream toe of the lowest spillway section. The discharge capacity of the lake drain structure is such that the 48 inch dia. pipe does not flow full. The time required to lower the lake from elevation 351 to elevation 346 is approximately two weeks. This means that the lake surface can be lowered in the average 4 inches per day. THE LAKE CAN NOT BE LOWERED BELOW ELEVATION 346.00 A.

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CLIENT: CoE

PROJECT: Dam Inspection

FILING CODE

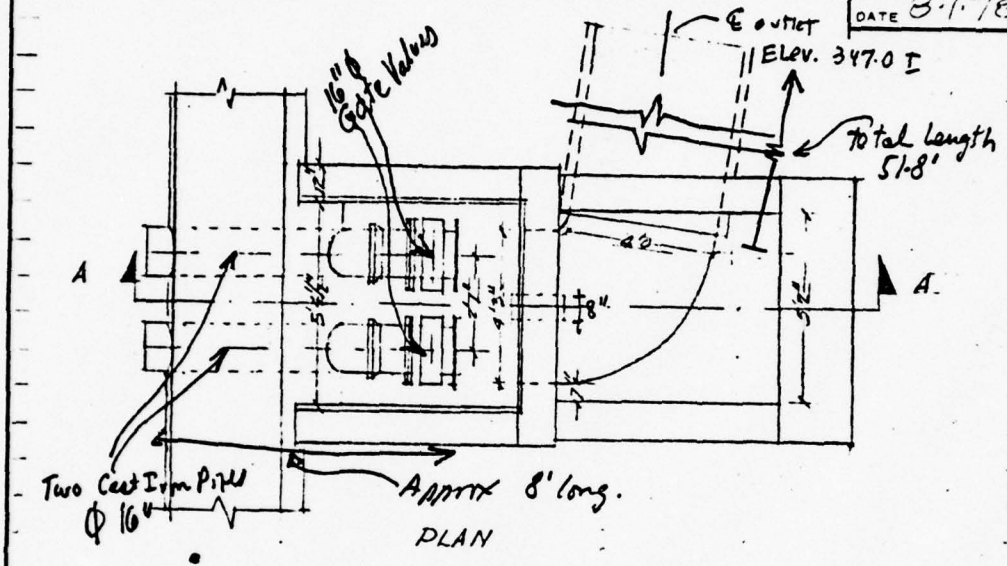
W.O. 7249 | PAGE 17 OF

SYSTEM: Lake Vreeland

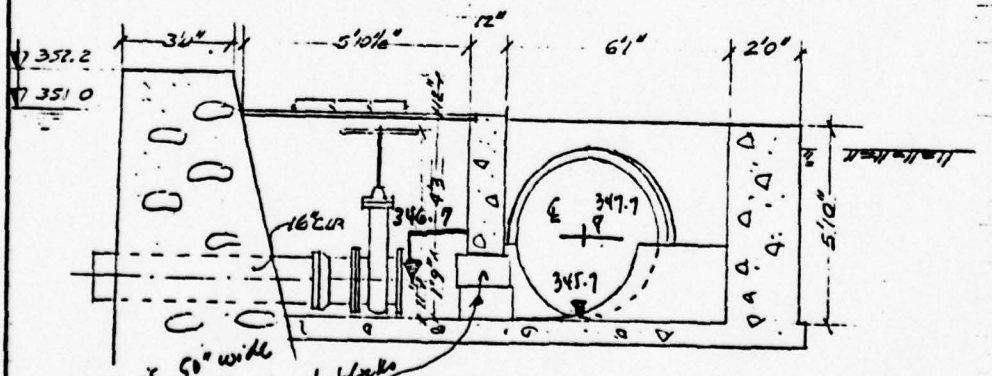
ORIGINATOR: Rudi Visser
DATE: July 15, 1978

CALCULATION FOR: Lake Drawdown

REVIEWED: [illegible]
DATE: 8-1-78



PLAN



Opening is 50" wide and 21" high; it has 2 supporting Concrete blocks in the center of span

SECTION A-A

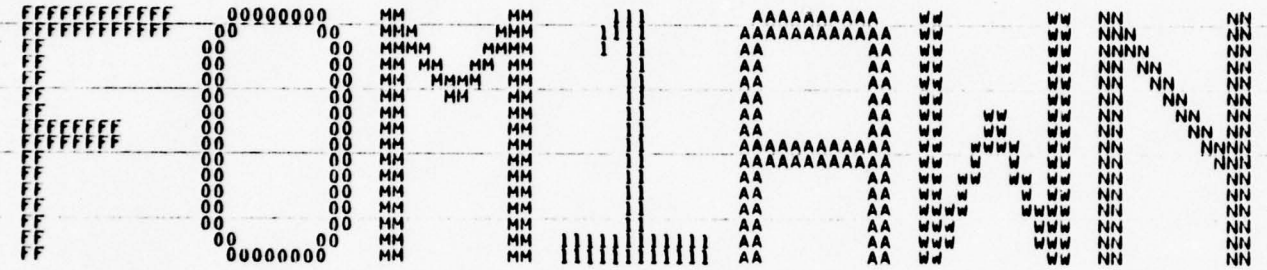
GLEN WILD LAKE DAM
DETAILS - VALVE PIT
¼ INCH = 1 FOOT

FILING CODE

GAI 350 REV. 10-72

6000 REMOTE BATCH

FOMlAwN *UNITED COMPUTING* 67. APEX/SL D.2.0
10.02.04. 07/19/78.



Sheet 1 of 115

COPY WITH FLASH RATHER
WITH A PATCHY FLASH/ARDS

1) 2.5 PAF
2) 2.4 PAF
3) 2.3 PAF
4) 2.2 PAF

```
**********
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
**********
```

****
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****

FLOOD ROUTING THROUGH GLEN WILD LAKE
WITHOUT FLASHBOARDS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
90	0	10	1	-0	-0	-0	2	-0	-0

JOPER	NWT
3	-0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	-0	-0	-0	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.04	-0.00	1.04	1.00	.500	-0	-0	-0

PRECIP DATA

NP	STORM	DAJ	DAK
72	-0.00	-0.00	-0.00

PRECIP PATTERN

.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
.06	.06	.19	.19	.19	.19	.19	.19	.19	.19
.19	.19	.19	.19	.38	.38	.38	.38	.38	.38
.47	.47	.47	.47	.47	.47	.58	.58	.58	.58
.58	.58	.88	1.05	1.31	3.33	1.23	.96	.54	.54
.54	.54	.54	.54	.42	.42	.42	.42	.42	.42
.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
.09	.09								

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	1.00	.15	-0.00	.16

GIVEN UNIT GRAPH, NUHGQ= 9

201.	403.	604.	805.	671.	537.	403.	268.	134.

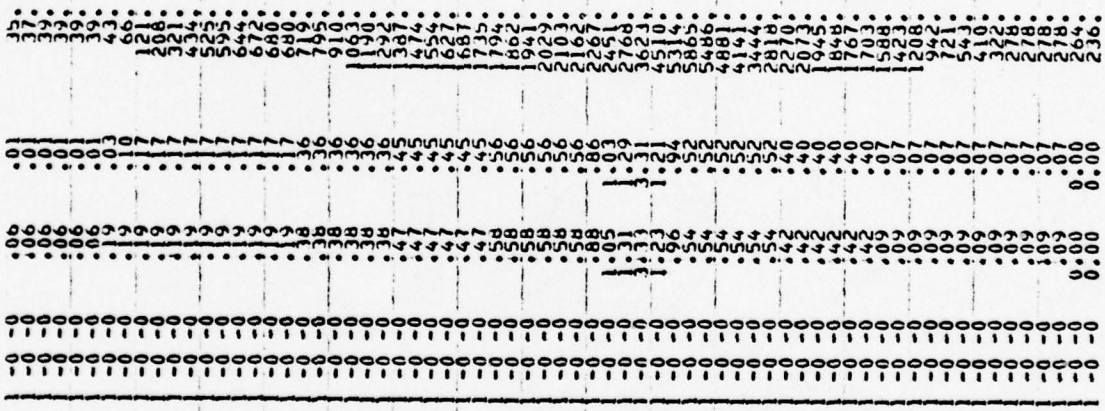
UNIT GRAPH TOTALS 4026. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

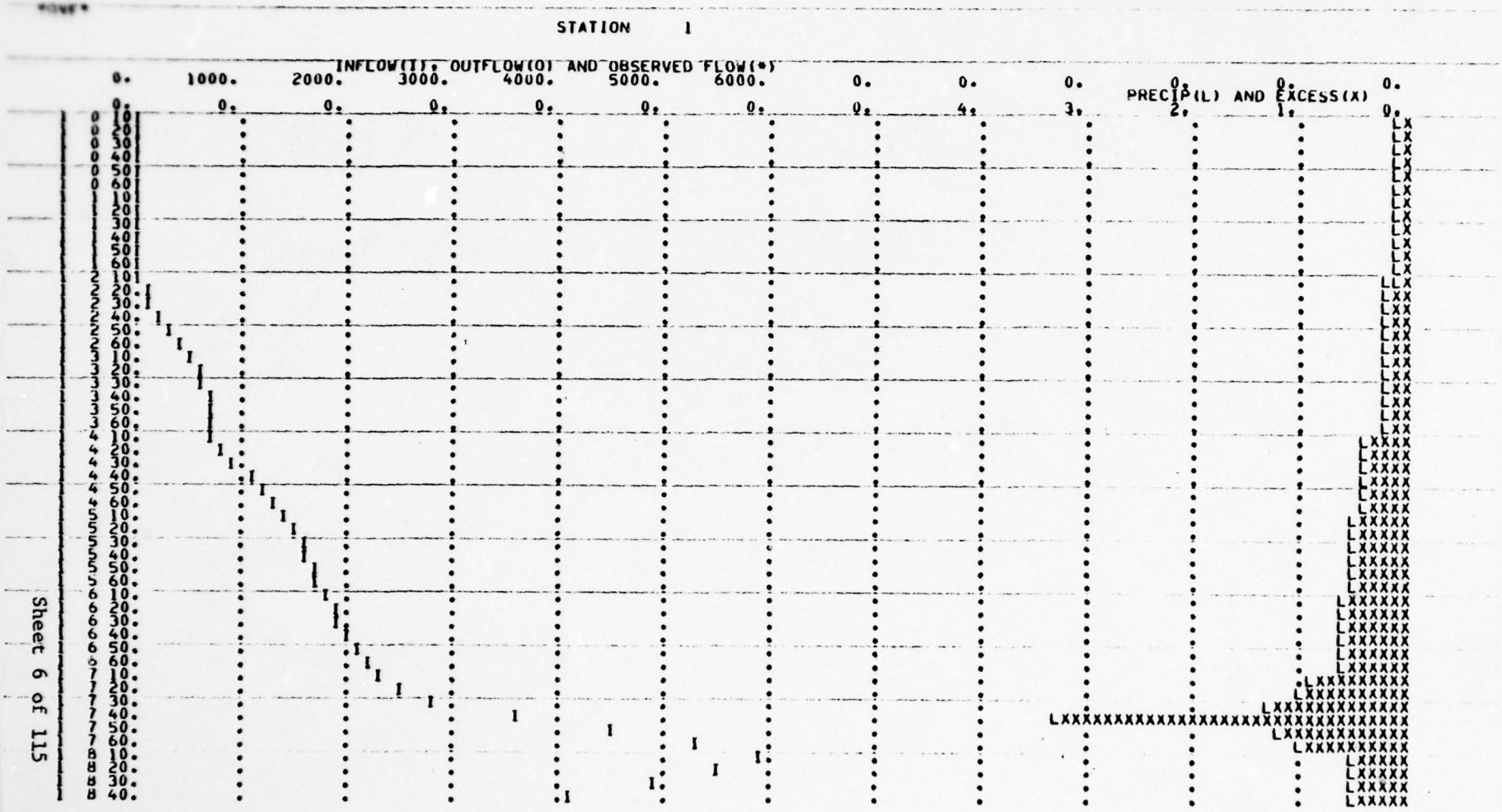
TIME		RAIN	EXCS	COMP Q
-0	-0	.06	.01	2.
-0	-0	.06	.01	6.
-0	-0	.06	.01	12.
-0	-0	.06	.01	19.
-0	-0	.06	.01	26.
-0	-0	.06	.01	31.

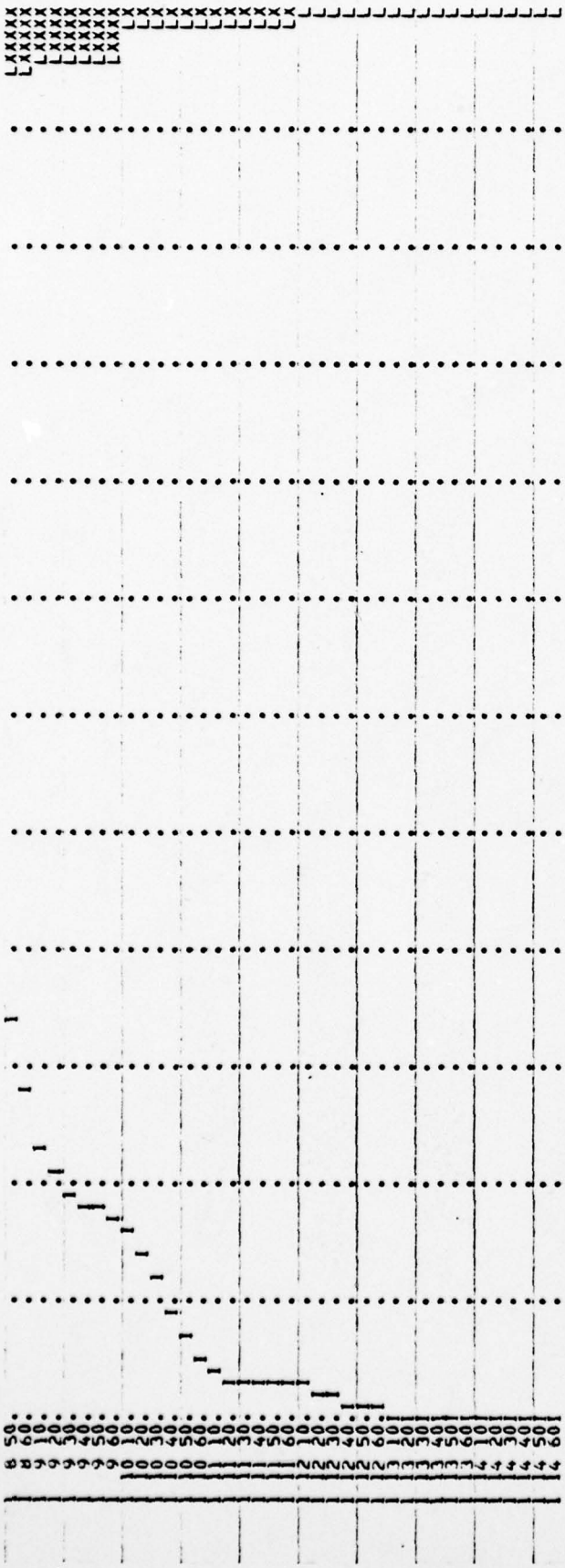


```
 1 -0 -0   0.00    0.00       194.
 1 -0 -0   0.00    0.00       139.
 1 -0 -0   0.00    0.00        93.
 1 -0 -0   0.00    0.00        56.
 1 -0 -0   0.00    0.00        28.
 1 -0 -0   0.00    0.00         9.
 1 -0 -0   0.00    0.00         0.
 1 -0 -0   0.00    0.00         0.
 1 -0 -0   0.00    0.00         0.
 1 -0 -0   0.00    0.00         0.
 1 -0 -0   0.00    0.00         0.
 1 -0 -0   0.00    0.00         0.
 1 -0 -0   0.00    0.00         0.
 1 -0 -0   0.00    0.00         0.
 1 -0 -0   0.00    0.00         0.
 1 -0 -0   0.00    0.00         0.

        SUM  27.18   25.17    101099.

            PEAK    6-HOUR    24-HOUR    72-HOUR   TOTAL VOLUME
     CFS    5865.    2453.     1123.      1123.       101097.
  INCHES             21.94     25.12      25.12         25.12
   AC-FT             1217.     1393.      1393.         1393.
```


STATION 1
INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
0. 1000. 2000. 3000. 4000. 5000. 6000.
PRECIP(L) AND EXCESS(X)
0. 1. 2. 3. 4.

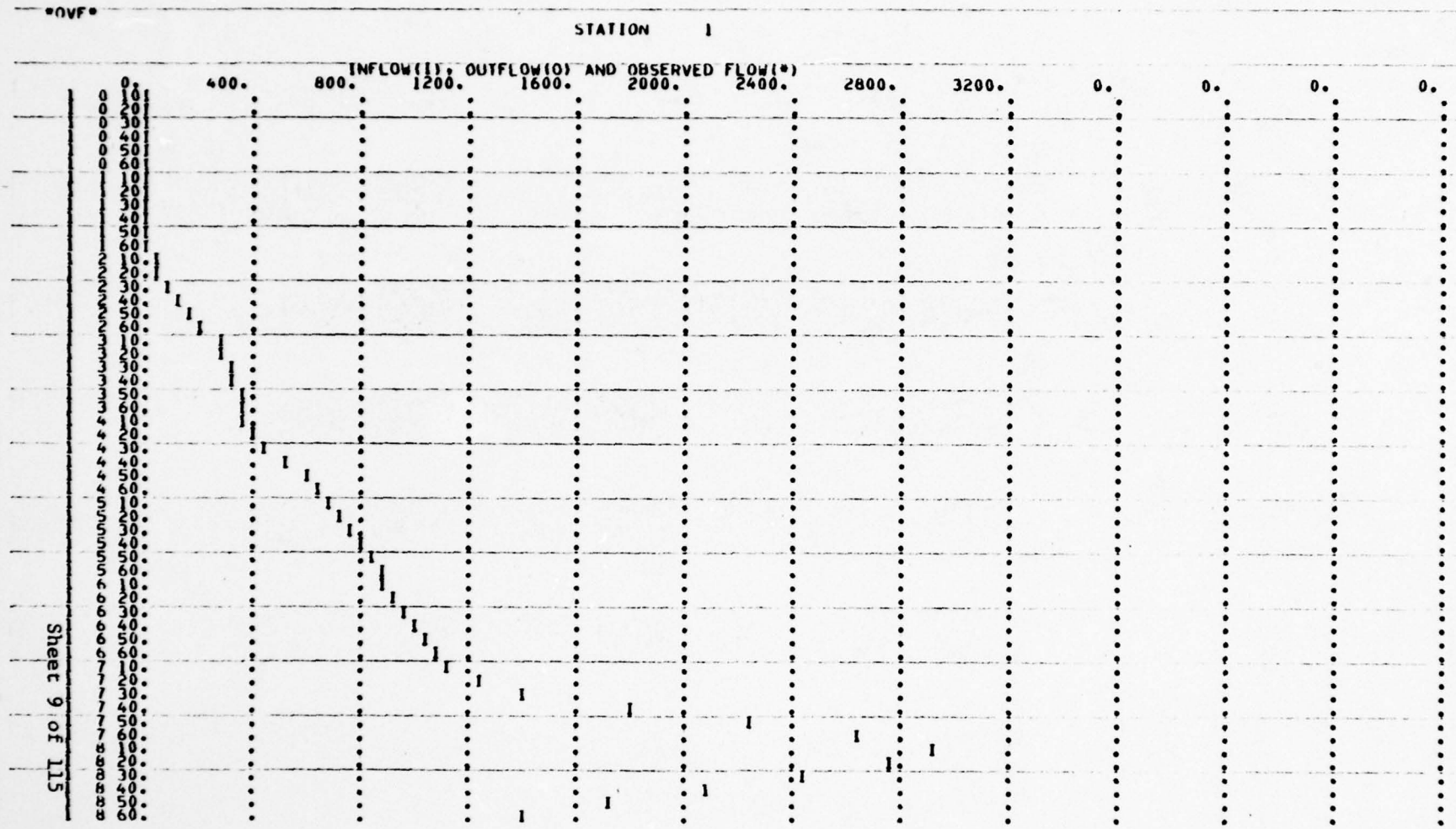


QVN

RUNOFF MULTIPLIED BY .50

1.	3.	6.	10.	13.	15.	17.	19.	19.	19.
19.	19.	21.	33.	61.	104.	160.	217.	263.	298.
322.	336.	340.	340.	359.	398.	455.	531.	595.	646.
694.	737.	777.	813.	843.	868.	897.	931.	970.	1015.
1051.	1081.	1133.	1226.	1384.	1811.	2255.	2657.	2933.	2743.
2441.	2070.	1722.	1409.	1135.	1037.	973.	924.	884.	851.
794.	712.	604.	471.	360.	272.	205.	161.	139.	139.
139.	139.	132.	118.	97.	69.	46.	28.	14.	5.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2933.	1226.	562.	562.	50548.
INCHES		10.97	12.56	12.56	12.56
AC-FT		608.	697.	697.	697.


OVF
STATION 1
INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
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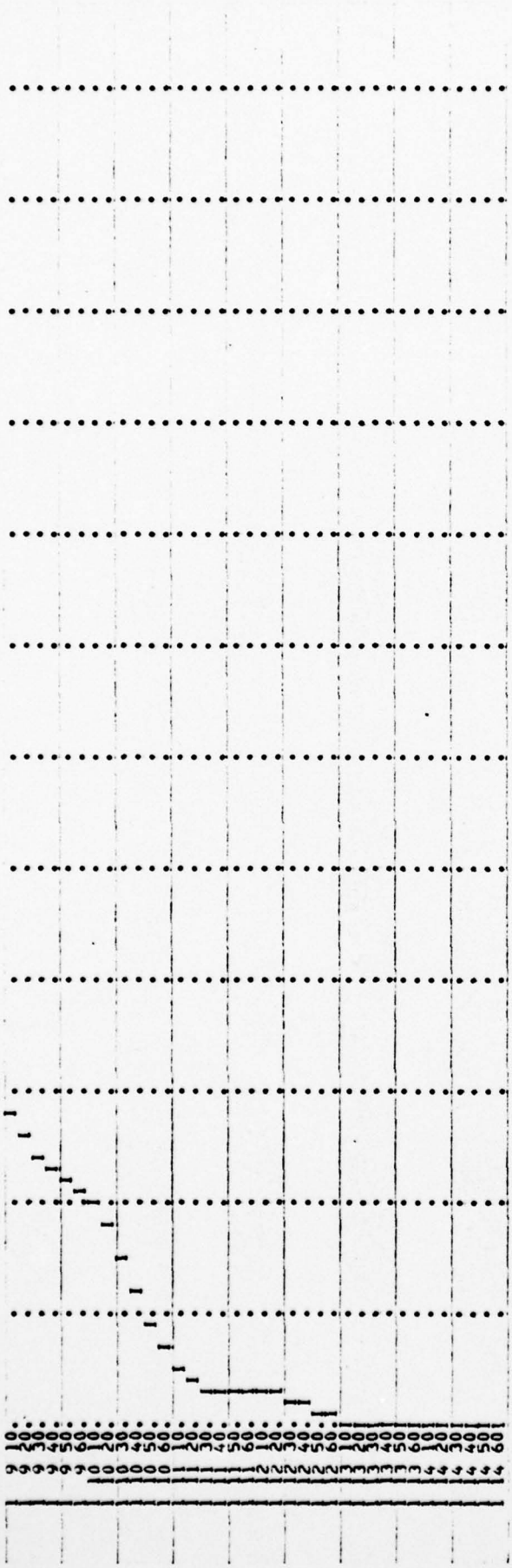


OVN

HYDROGRAPH ROUTING

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
	1	-0	-0	-0	-0	-0

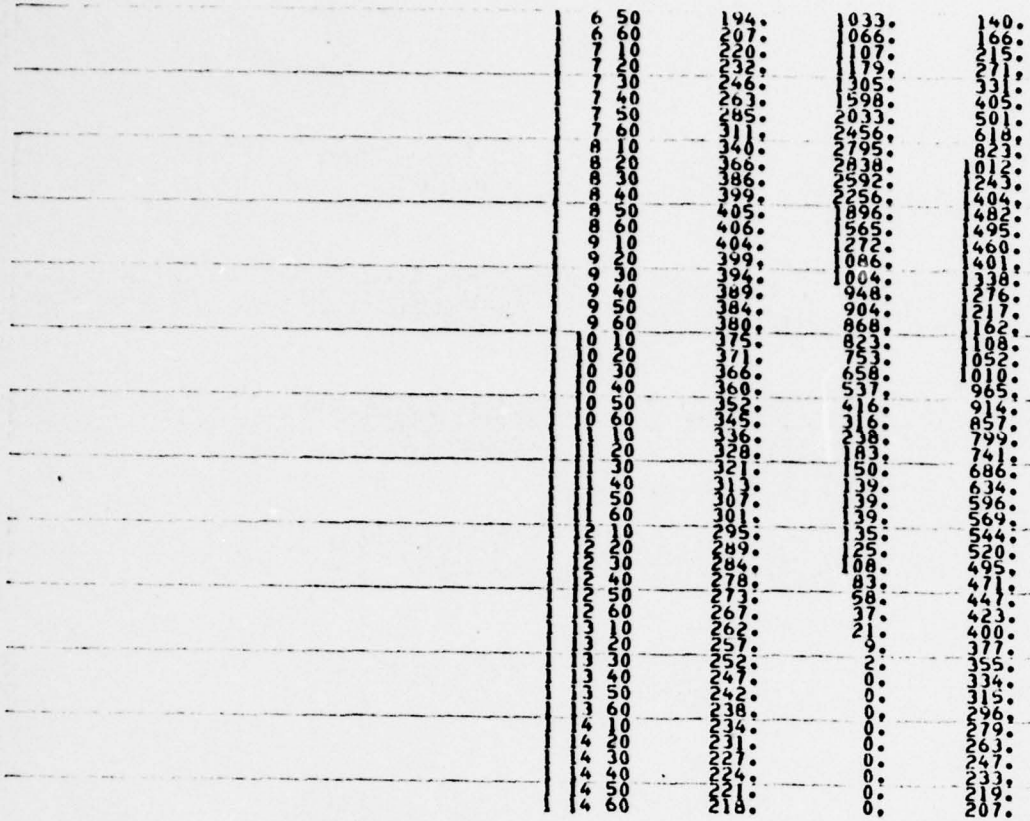
ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
=0.0	-0.000	-0.00	1	-0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA
-0	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	0:	70:	130:	180:	210:	310:	370:	450:	550:	740:
OUTFLOW=	0.	20.	51.	110.	173.	610.	1040.	2040.	3660.	8000.

TIME	EOP STOR	AVG IN	EOP OUT
0 10	3.	1.	.
0 20	3.	2.	.
0 30	3.	4.	.
0 40	4.	8.	.
0 50	4.	11.	.
0 60	4.	14.	.
1 10	4.	16.	.
1 20	4.	18.	.
1 30	5.	19.	.
1 40	5.	19.	.
1 50	5.	19.	.
1 60	5.	19.	2.
2 10	6.	20.	5.
2 20	6.	27.	2.
2 30	7.	47.	2.
2 40	8.	82.	2.
2 50	9.	132.	3.
2 60	12.	189.	3.
3 10	15.	240.	4.
3 20	19.	280.	5.
3 30	23.	310.	7.
3 40	28.	329.	8.
3 50	32.	338.	9.
3 60	37.	340.	10.
4 10	41.	350.	12.
4 20	46.	378.	13.
4 30	52.	426.	15.
4 40	59.	493.	17.
4 50	66.	563.	19.
4 60	74.	621.	22.
5 10	83.	670.	27.
5 20	93.	715.	32.
5 30	103.	757.	37.
5 40	113.	795.	42.
5 50	124.	828.	48.
5 60	135.	856.	57.
6 10	146.	882.	70.
6 20	158.	914.	84.
6 30	170.	951.	98.
6 40	182.	992.	114.



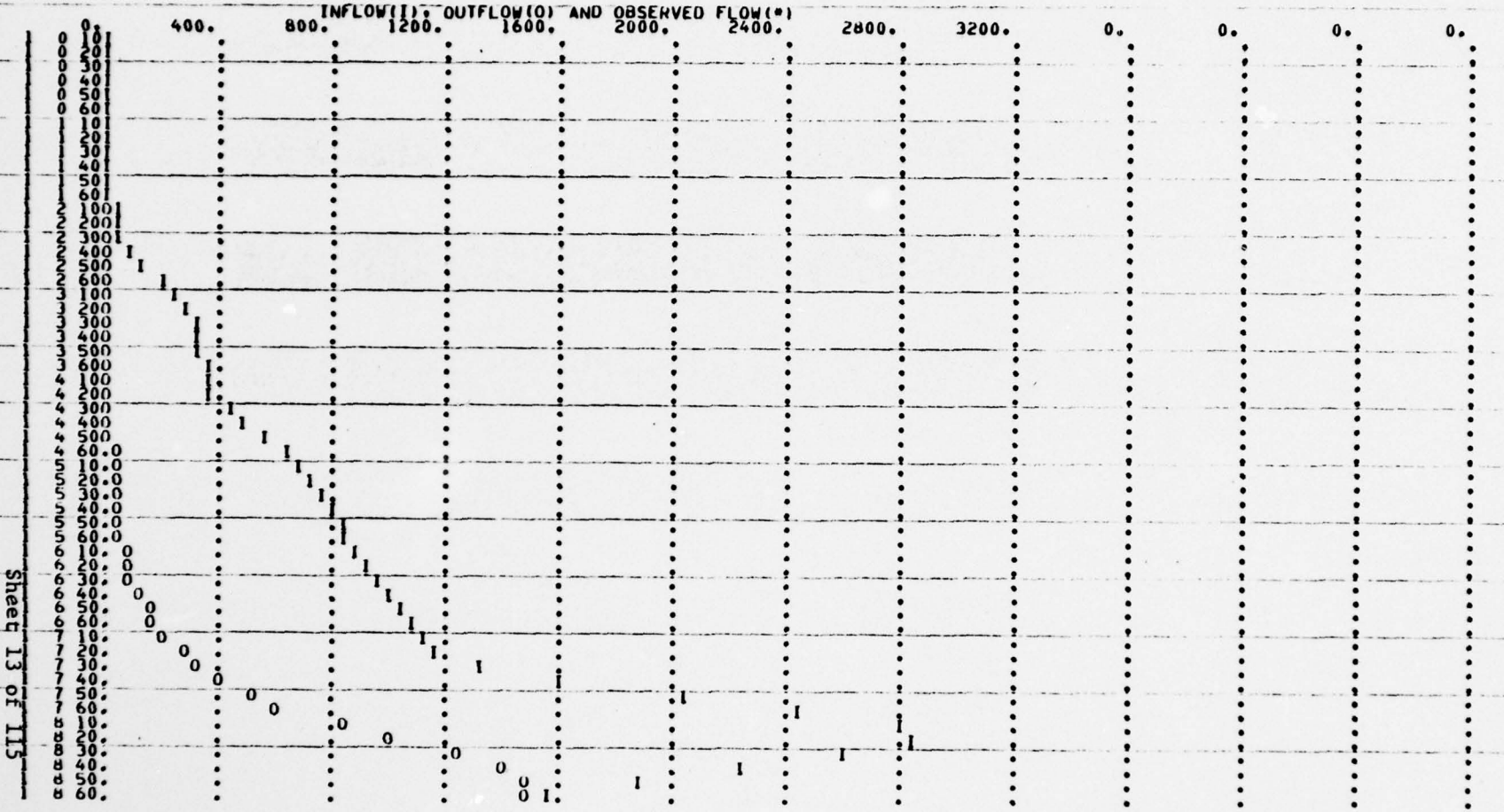
6 50	194.	1033.	140.	
6 60	207.	1066.	166.	
7 10	220.	1107.	215.	
7 20	232.	1179.	271.	
7 30	246.	1305.	331.	
7 40	263.	1598.	405.	
7 50	285.	2033.	501.	
7 60	311.	2456.	618.	
8 10	340.	2795.	823.	
8 20	366.	2838.	1012.	
8 30	386.	2592.	1243.	
8 40	399.	2256.	1404.	
8 50	405.	1896.	1482.	
8 60	406.	1565.	1495.	
9 10	404.	1272.	1460.	
9 20	399.	1086.	1401.	
9 30	394.	1004.	1338.	
9 40	389.	948.	1276.	
9 50	384.	904.	1217.	
9 60	380.	868.	1162.	
10 10	375.	823.	1108.	
10 20	371.	753.	1052.	
10 30	366.	658.	1010.	
10 40	360.	537.	965.	
10 50	352.	416.	914.	
10 60	345.	316.	857.	
11 10	336.	238.	799.	
11 20	328.	183.	741.	
11 30	321.	150.	686.	
11 40	313.	139.	634.	
11 50	307.	139.	596.	
11 60	301.	139.	569.	
12 10	295.	135.	544.	
12 20	289.	125.	520.	
12 30	284.	108.	495.	
12 40	278.	83.	471.	
12 50	273.	58.	447.	
12 60	267.	37.	423.	
13 10	262.	21.	400.	
13 20	257.	9.	377.	
13 30	252.	2.	355.	
13 40	247.	0.	334.	
13 50	242.	0.	315.	
13 60	238.	0.	296.	
14 10	234.	0.	279.	
14 20	231.	0.	263.	
14 30	227.	0.	247.	
14 40	224.	0.	233.	
14 50	221.	0.	219.	
14 60	218.	0.	207.	
SUM			35094.	

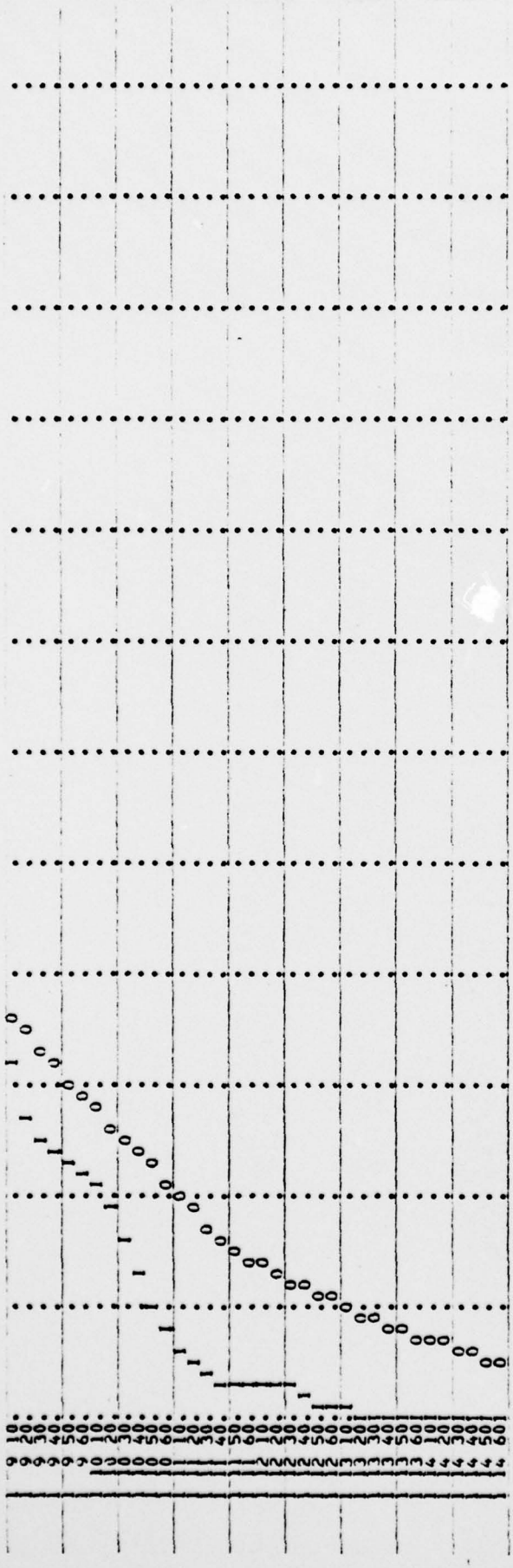
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1495.	856.	390.	340.	35094.
INCHES		7.65	8.72	8.72	8.72
AC-FT		424.	484.	484.	484.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)





•NAO•

RUNOFF SUMMARY, AVERAGE FLOW

HYDROGRAPH AT ROUTED TO	PEAK 2933. 1495.	6-HOUR 1226. 856.	24-HOUR 562. 390.	72-HOUR 562. 390.	AREA 1.04 1.04

****
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****

FLOOD ROUTING THROUGH GLEN WILD LAKE
WITHOUT FLASHBOARDS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
90	0	10	1	-0	-0	-0	2	-0	-0

JOPER	NWT
3	-0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	-0	-0	-0	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.04	-0.00	1.04	1.00	.400	-0	-0	-0

PRECIP DATA

NP	STORM	DAJ	DAK
72	-0.00	-0.00	-0.00

PRECIP PATTERN

.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
.06	.06	.19	.19	.19	.19	.19	.19	.19	.19
.19	.19	.19	.19	.38	.38	.38	.38	.38	.38
.47	.47	.47	.47	.47	.47	.58	.58	.58	.58
.58	.58	.88	1.05	1.31	3.33	1.23	.96	.54	.54
.54	.54	.54	.54	.42	.42	.42	.42	.42	.42
.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
.09	.09								

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	1.00	.15	-0.00	.16

GIVEN UNIT GRAPH, NUHGQ= 9

201.	403.	604.	805.	671.	537.	403.	268.	134.

UNIT GRAPH TOTALS 4026. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

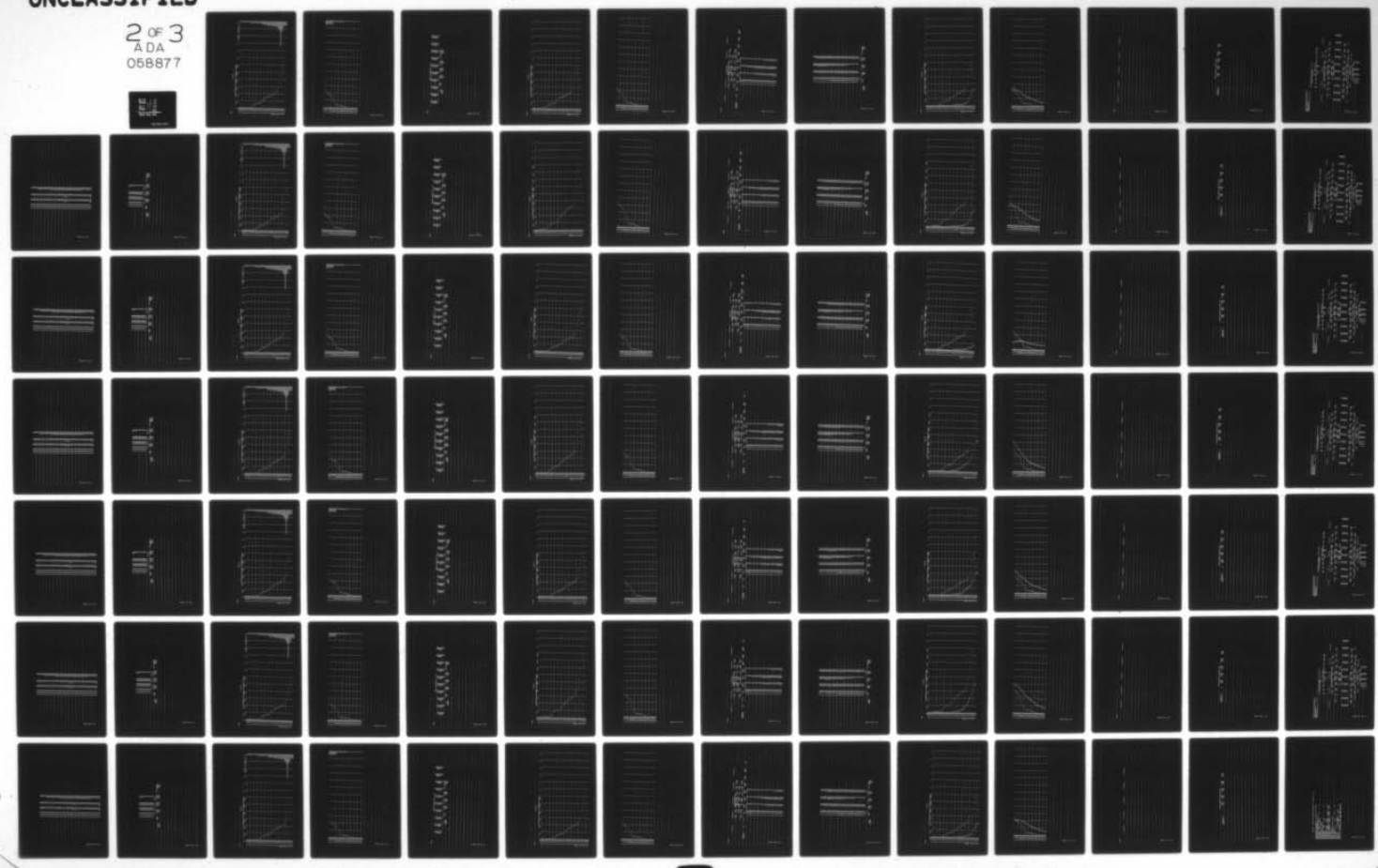
TIME		RAIN	EXCS	COMP Q
-0	-0	.06	.01	2.
-0	-0	.06	.01	6.
-0	-0	.06	.01	12.
-0	-0	.06	.01	19.
-0	-0	.06	.01	26.
-0	-0	.06	.01	31.

-0	-0	0.00	0.00	194.
-0	-0	0.00	0.00	139.
-0	-0	0.00	0.00	93.
-0	-0	0.00	0.00	56.
-0	-0	0.00	0.00	28.
-0	-0	0.00	0.00	9.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
	SUM	27.18	25.17	101099.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5865.	2453.	1123.	1123.	101097.
INCHES		21.94	25.12	25.12	25.12
AC-FT		1217.	1393.	1393.	1393.

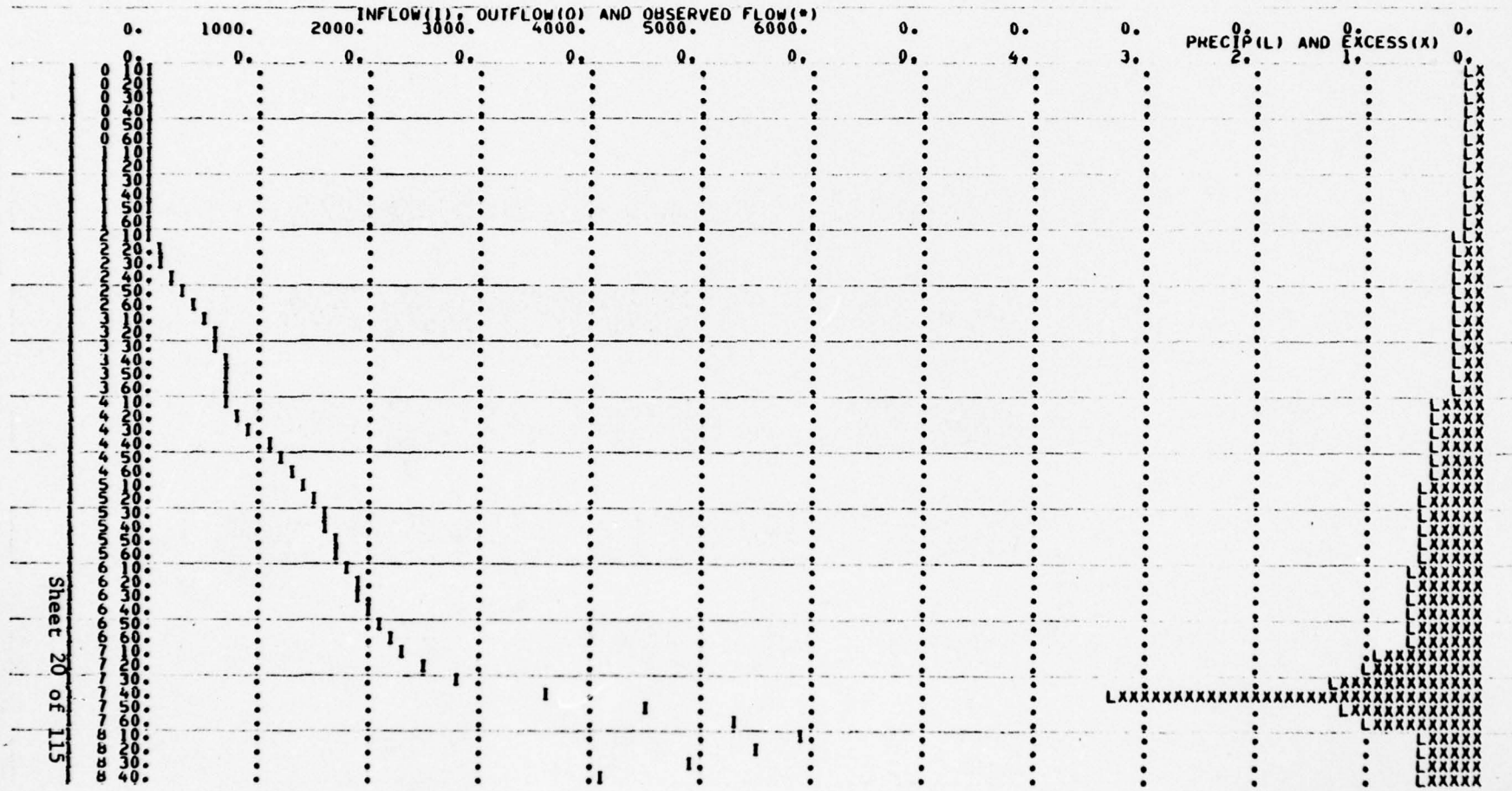
AD-A058 877 GILBERT ASSOCIATES INC READING PA F/G 13/2
NATIONAL DAM SAFETY PROGRAM. GLEN WILD LAKE (NJ00222). PASSAIC --ETC(U)
JUL 78 J M NORMANN DACW61-78-C-0114
UNCLASSIFIED NL

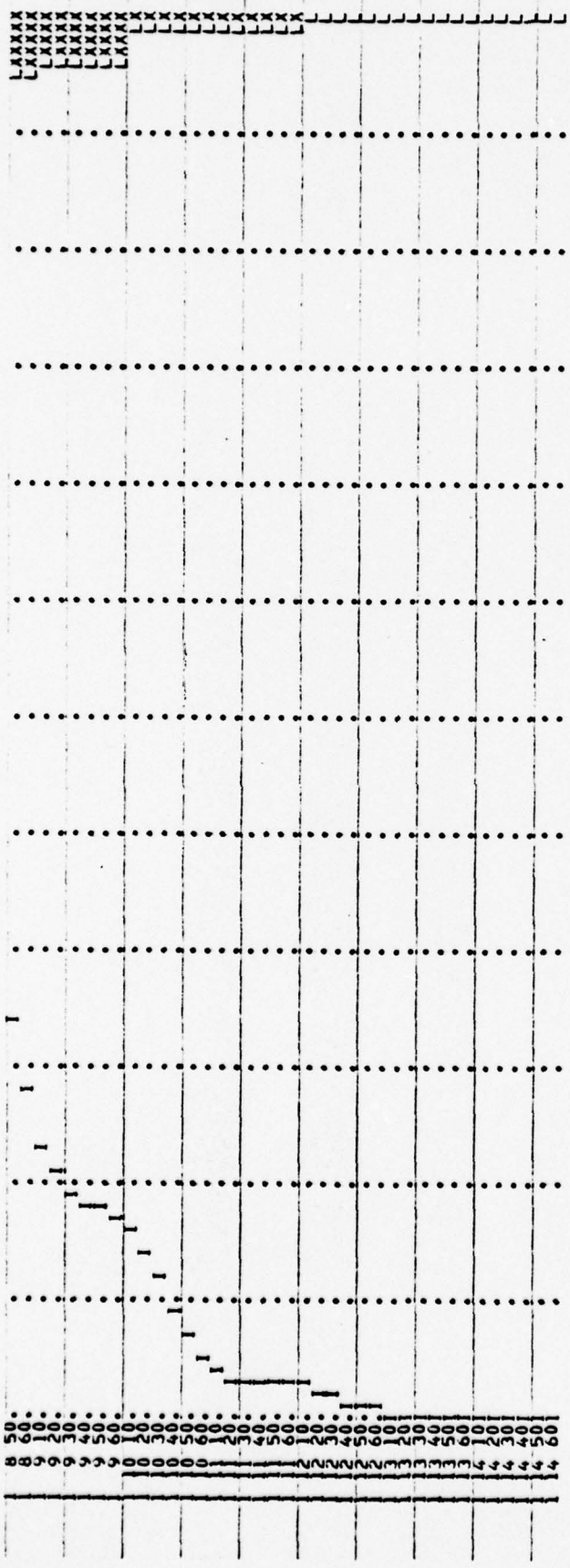
2 OF 3
ADA
058877



OVF

STATION 1





OVN

RUNOFF MULTIPLIED BY .40

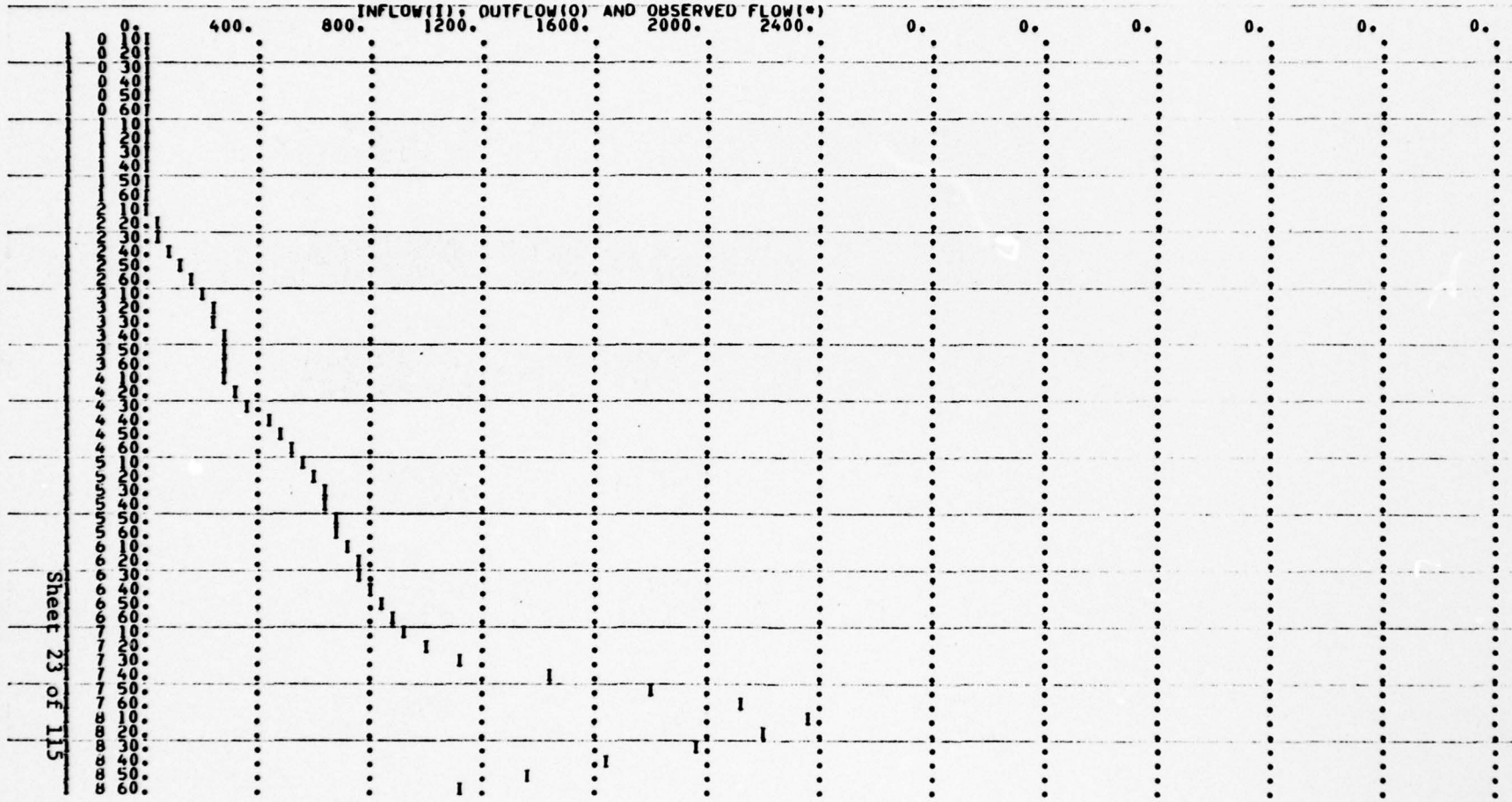
1.	2.	5.	8.	10.	12.	14.	15.	15.	15.
15.	15.	17.	26.	48.	83.	128.	173.	210.	238.
258.	269.	272.	272.	287.	318.	364.	425.	476.	517.
555.	590.	622.	651.	675.	694.	717.	745.	776.	812.
841.	865.	907.	980.	1107.	1449.	1804.	2126.	2346.	2194.
1953.	1656.	1378.	1127.	908.	829.	778.	739.	707.	681.
635.	569.	483.	377.	288.	217.	164.	129.	111.	111.
111.	111.	106.	94.	78.	56.	37.	22.	11.	4.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

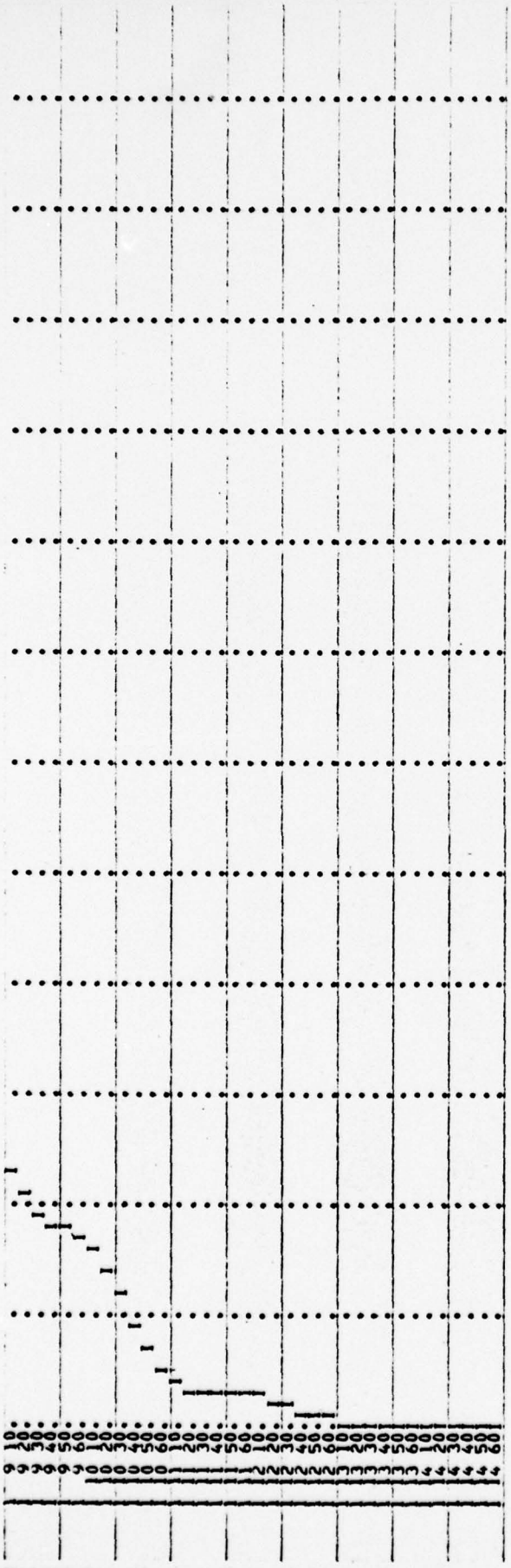
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2346.	981.	449.	449.	40439.
INCHES		8.77	10.05	10.05	10.05
AC-FT		487.	557.	557.	557.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)





OVN

HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	-0	-0	-0	-0	-0

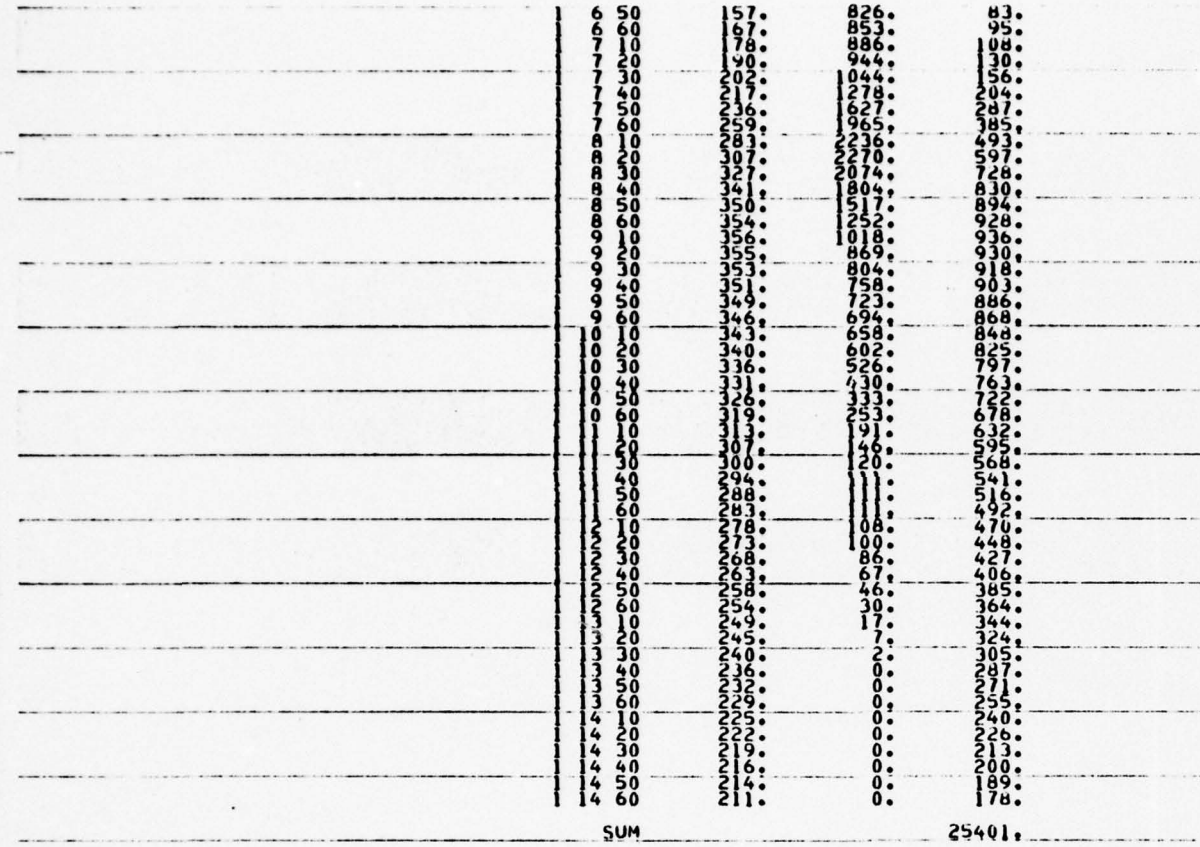
ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
-0	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	0.	70.	130.	180.	210.	310.	370.	450.	550.	740.
OUTFLOW=	0.	20.	51.	110.	173.	610.	1040.	2040.	3660.	8000.

TIME	EOP STOR	AVG IN	EOP OUT
0 10	3.	2.	1.
0 20	3.	2.	1.
0 30	3.	3.	1.
0 40	3.	6.	1.
0 50	3.	9.	1.
0 60	3.	11.	1.
1 10	3.	13.	1.
1 20	3.	14.	1.
1 30	4.	15.	1.
1 40	4.	15.	1.
1 50	4.	15.	1.
1 60	4.	15.	1.
2 10	4.	16.	1.
2 20	5.	22.	1.
2 30	5.	37.	1.
2 40	6.	66.	2.
2 50	8.	106.	2.
2 60	10.	151.	3.
3 10	12.	192.	3.
3 20	15.	224.	4.
3 30	19.	248.	5.
3 40	22.	263.	6.
3 50	26.	270.	7.
3 60	29.	272.	8.
4 10	33.	280.	9.
4 20	37.	303.	11.
4 30	42.	341.	12.
4 40	47.	395.	13.
4 50	53.	451.	15.
4 60	60.	497.	17.
5 10	67.	536.	19.
5 20	74.	572.	22.
5 30	82.	606.	26.
5 40	91.	636.	31.
5 50	99.	663.	35.
5 60	108.	684.	40.
6 10	117.	706.	44.
6 20	127.	731.	49.
6 30	137.	761.	59.
6 40	147.	794.	71.



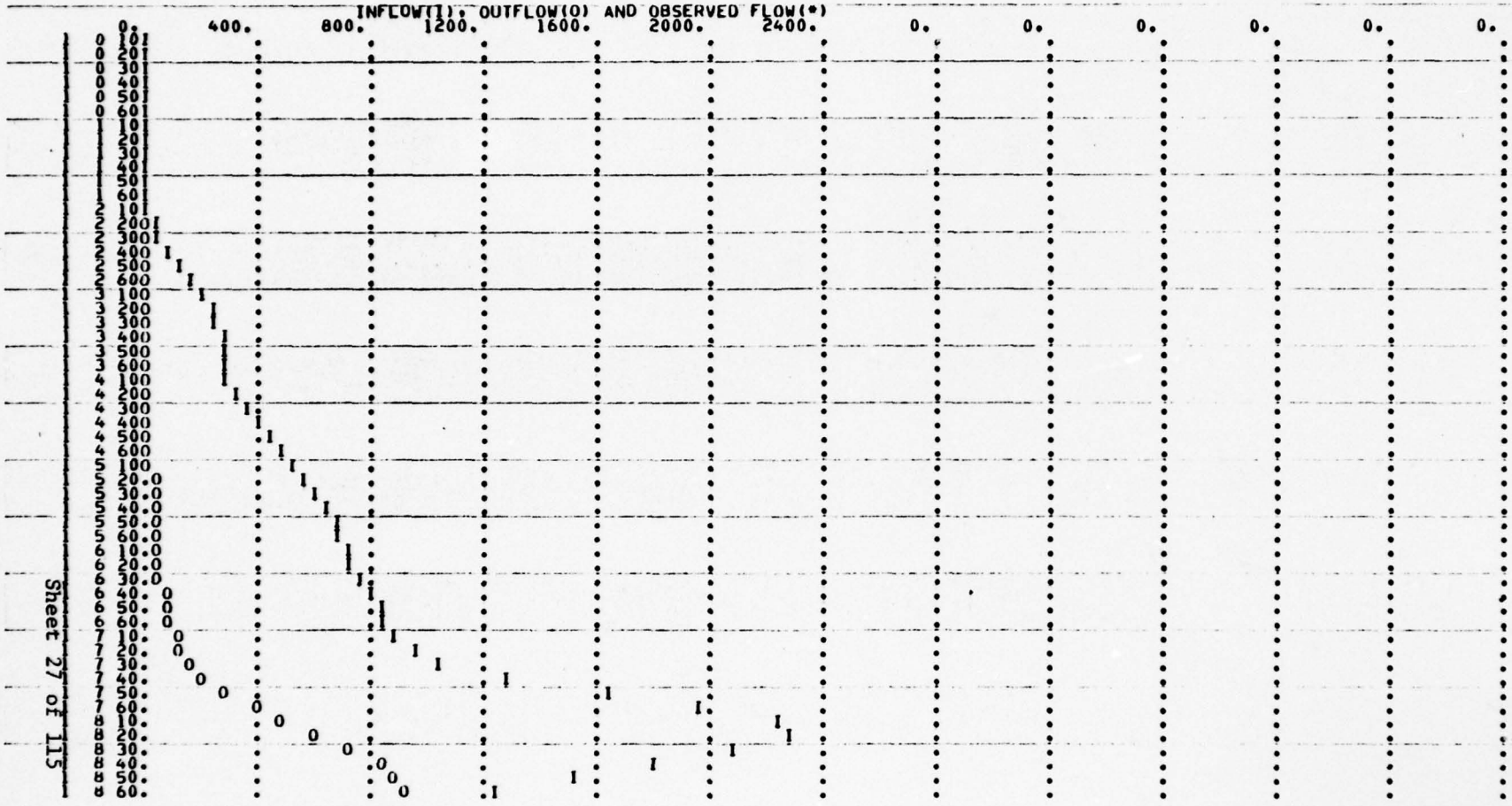
6	50	157.	826.	83.	
6	60	167.	853.	95.	
7	10	178.	886.	108.	
7	20	190.	944.	130.	
7	30	202.	1044.	156.	
7	40	217.	1278.	204.	
7	50	236.	1627.	287.	
7	60	259.	1965.	385.	
8	10	283.	2236.	493.	
8	20	307.	2270.	597.	
8	30	327.	2074.	728.	
8	40	341.	1804.	830.	
8	50	350.	1517.	894.	
8	60	354.	1252.	928.	
9	10	356.	1018.	936.	
9	20	355.	869.	930.	
9	30	353.	804.	918.	
9	40	351.	758.	903.	
9	50	349.	723.	886.	
9	60	346.	694.	868.	
10	10	343.	658.	848.	
10	20	340.	602.	825.	
10	30	336.	526.	797.	
10	40	331.	430.	763.	
10	50	326.	333.	722.	
10	60	319.	253.	678.	
11	10	313.	191.	632.	
11	20	307.	146.	595.	
11	30	300.	120.	568.	
11	40	294.	111.	541.	
11	50	288.	111.	516.	
11	60	283.	111.	492.	
12	10	278.	108.	470.	
12	20	273.	100.	448.	
12	30	268.	86.	427.	
12	40	263.	67.	406.	
12	50	258.	46.	385.	
12	60	254.	30.	364.	
13	10	249.	17.	344.	
13	20	245.	7.	324.	
13	30	240.	2.	305.	
13	40	236.	0.	287.	
13	50	232.	0.	271.	
13	60	229.	0.	255.	
14	10	225.	0.	240.	
14	20	222.	0.	226.	
14	30	219.	0.	213.	
14	40	216.	0.	200.	
14	50	214.	0.	189.	
14	60	211.	0.	178.	
		SUM		25401.	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	936.	620.	282.	282.	25401.
INCHES		5.55	6.31	6.31	6.31
AC-FT		308.	350.	350.	350.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)



NAD

RUNOFF SUMMARY, AVERAGE FLOW

HYDROGRAPH AT ROUTED TO	PEAK 2346. 936.	6-HOUR 981. 620.	24-HOUR 449. 282.	72-HOUR 449. 282.	AREA 1.04 1.04

****
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****

FLOOD ROUTING THROUGH GLEN WILD LAKE
WITHOUT FLASHBOARDS

JOB SPECIFICATION

NO	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
90	0	10	1	-0	-0	-0	2	-0	-0

JOPER: 3 NWT: -0

****

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	-0	-0	-0	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.04	-0.00	1.04	1.00	.300	-0	-0	-0

PRECIP DATA

NP	STORM	DAJ	DAK
72	-0.00	-0.00	-0.00

PRECIP PATTERN

.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
.06	.06	.19	.19	.19	.19	.19	.19	.19	.19
.19	.19	.19	.19	.38	.38	.38	.38	.38	.38
.47	.47	.47	.47	.47	.47	.58	.58	.58	.58
.58	.58	.88	1.05	1.31	3.33	1.23	.96	.54	.54
.54	.54	.54	.54	.42	.42	.42	.42	.42	.42
.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
.09	.09								

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	1.00	.15	-0.00	.16

GIVEN UNIT GRAPH, NUHGQ= 9

201.	403.	604.	805.	671.	537.	403.	268.	134.

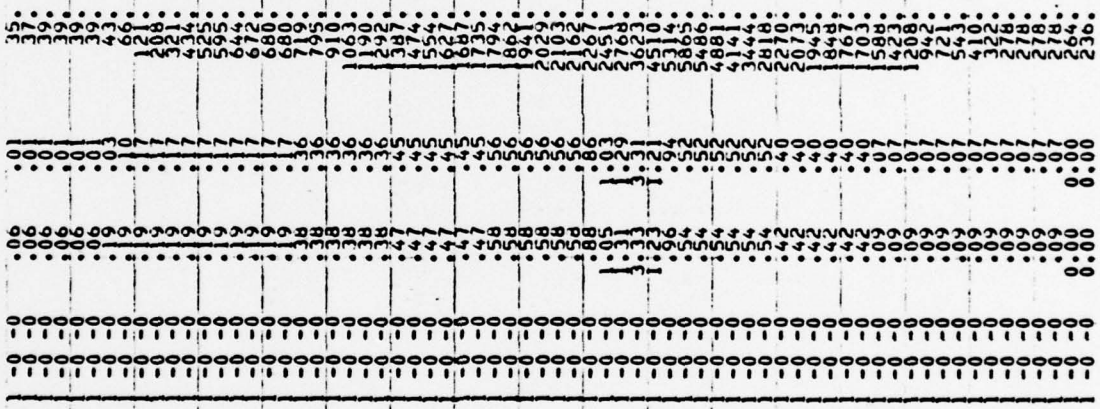
UNIT GRAPH TOTALS 4026. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

	TIME	RAIN	EXCS	COMP Q
1	-0 -0	.06	.01	2.
1	-0 -0	.06	.01	6.
1	-0 -0	.06	.01	12.
1	-0 -0	.06	.01	19.
1	-0 -0	.06	.01	26.
1	-0 -0	.06	.01	31.

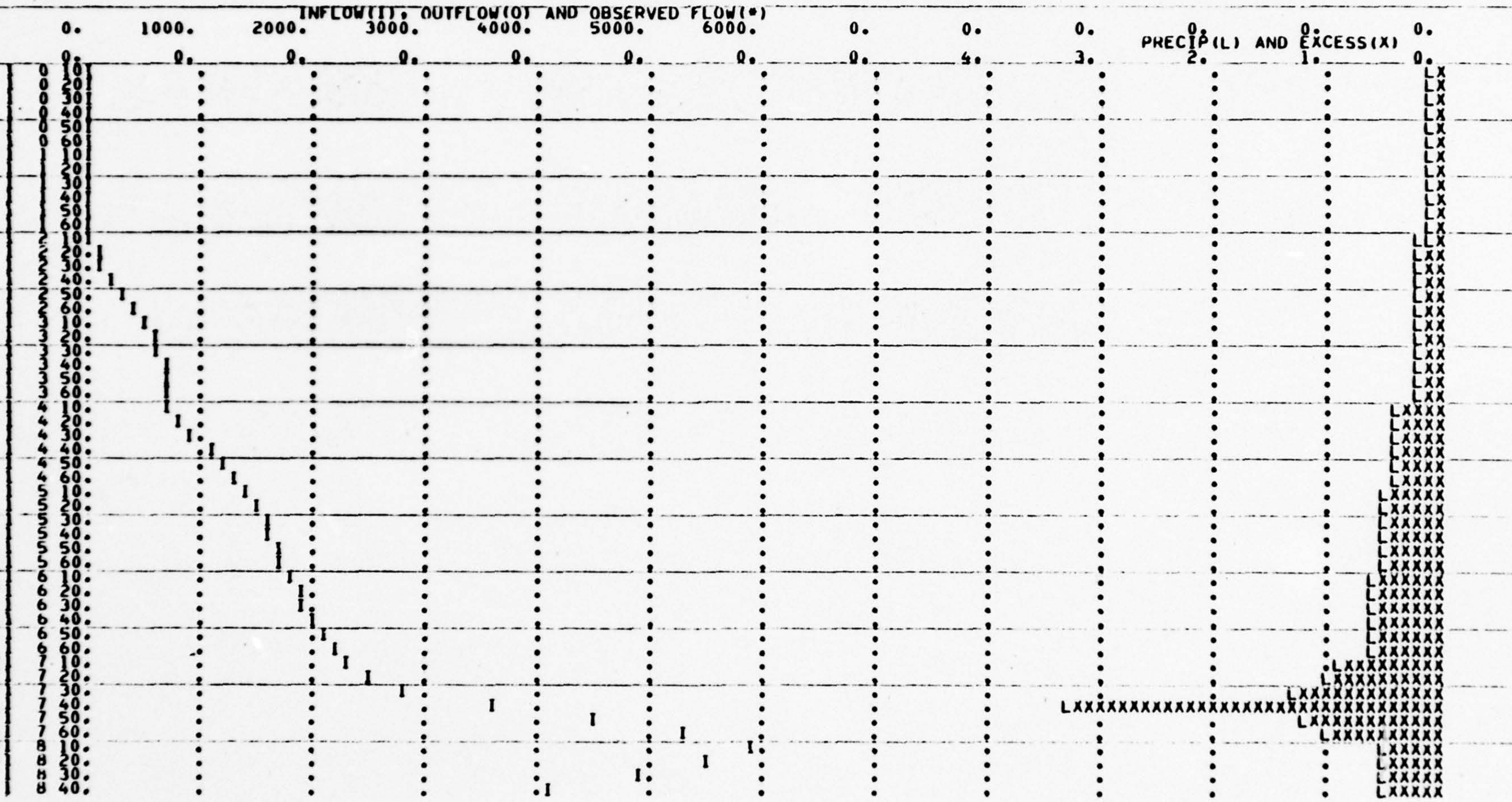


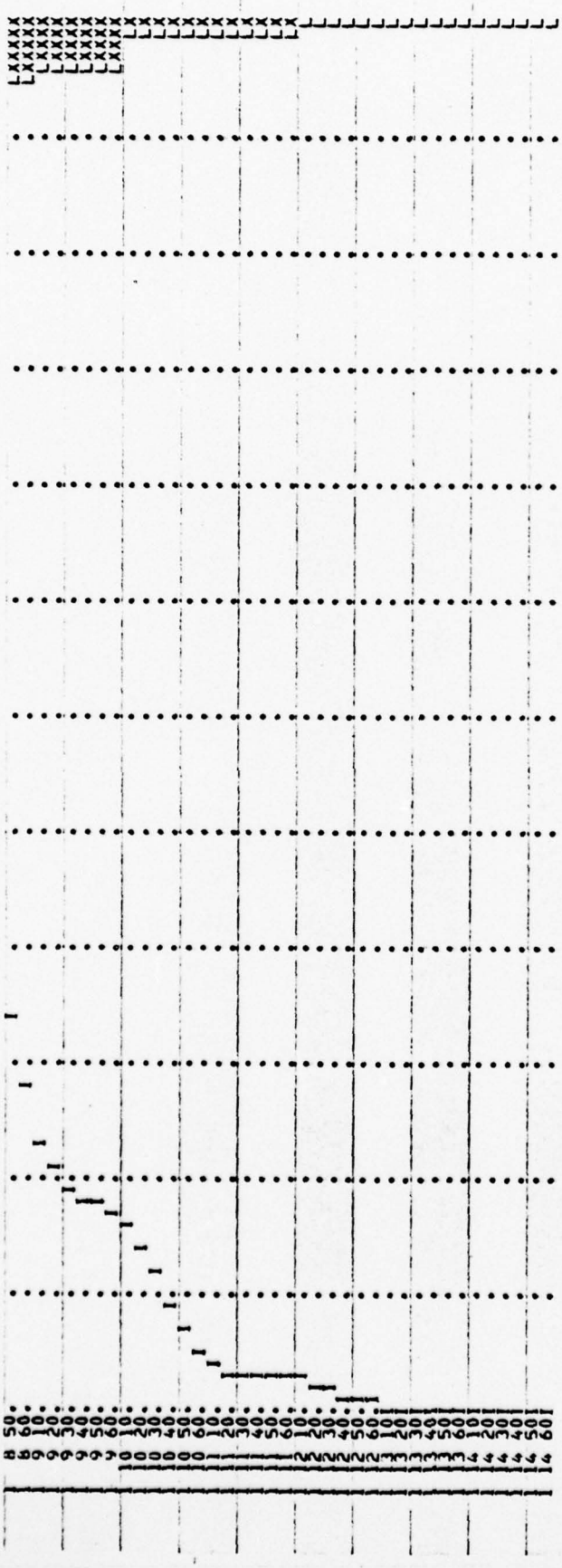
-0	-0	0.00	0.00	144.
-0	-0	0.00	0.00	139.
-0	-0	0.00	0.00	93.
-0	-0	0.00	0.00	56.
-0	-0	0.00	0.00	28.
-0	-0	0.00	0.00	9.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
SUM		27.18	25.17	101099.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5865.	2453.	1123.	1123.	101097.
INCHES		21.94	25.12	25.12	25.12
AC-FT		1217.	1393.	1393.	1393.

OVF

STATION 1





OVN

RUNOFF MULTIPLIED BY .30

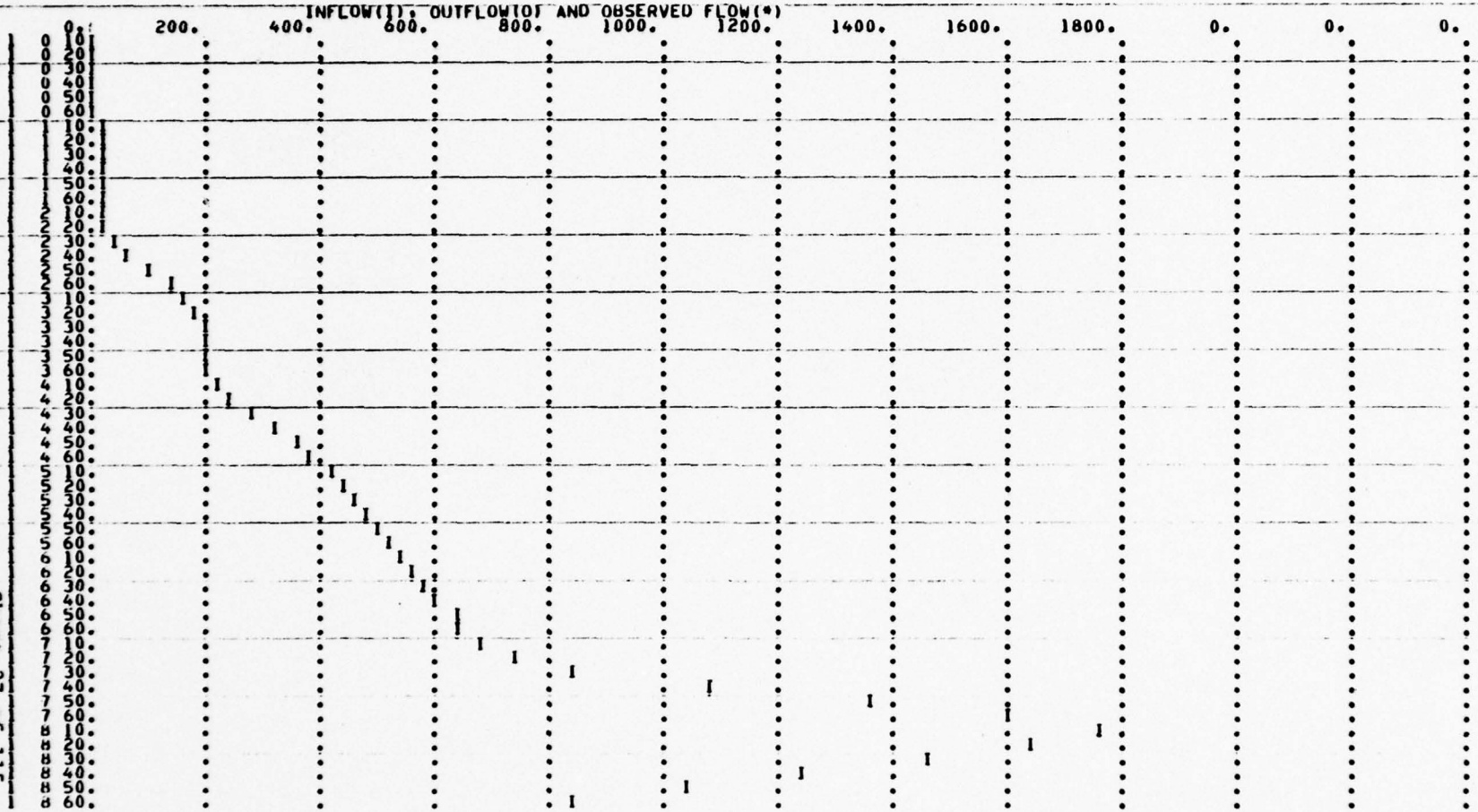
1:	2:	3:	4:	5:	6:	7:	8:	9:	10:	11:	12:	12:
12:	12:	13:	20:	36:	62:	96:	130:	158:	179:			
193:	201:	204:	204:	216:	239:	273:	319:	357:	388:			
416:	442:	466:	488:	506:	521:	538:	559:	582:	609:			
631:	649:	680:	735:	830:	1087:	1353:	1594:	1760:	1646:			
1464:	1242:	1033:	845:	681:	622:	583:	554:	530:	511:			
476:	427:	362:	283:	216:	163:	123:	97:	83:	83:			
83:	83:	79:	71:	58:	42:	28:	17:	8:	3:			
0:	0:	0:	0:	0:	0:	0:	0:	0:	0:			

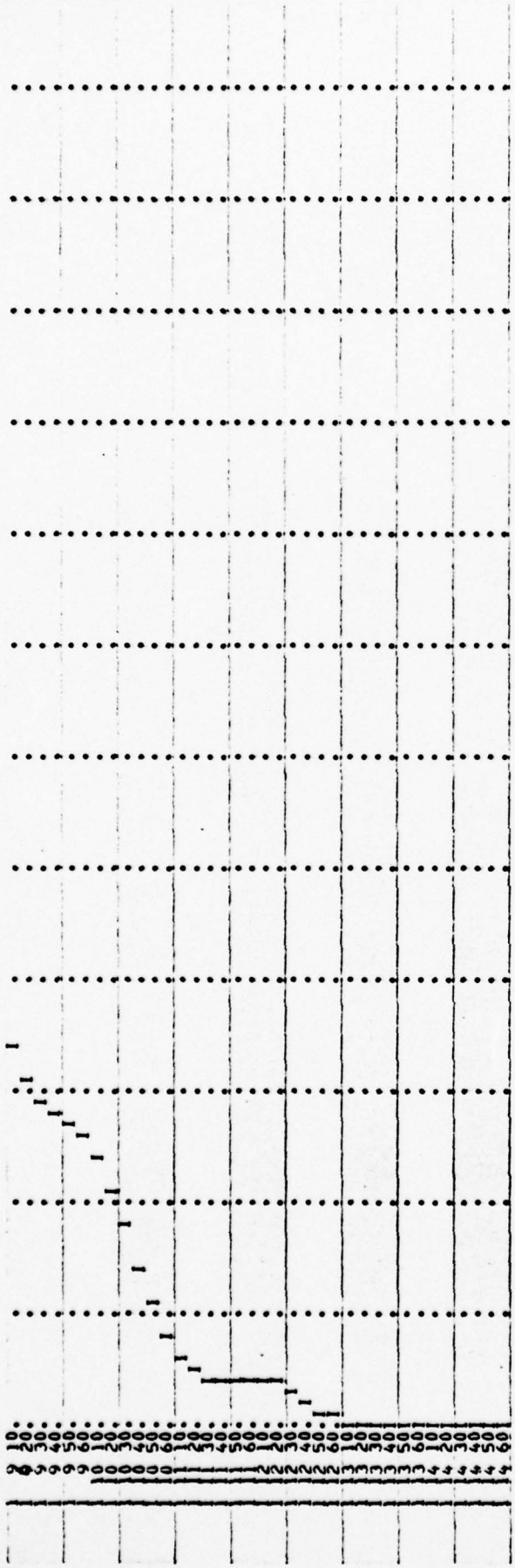
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1760.	736.	337.	337.	30329.
INCHES		6.58	7.54	7.54	7.54
AC-FT		365.	418.	418.	418.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)





OVN

HYDROGRAPH ROUTING

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	-0	-0	-0	-0	-0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
-0	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	0.	70.	130.	180.	210.	310.	370.	450.	550.	740.
OUTFLOW=	0.	20.	51.	110.	173.	610.	1040.	2040.	3660.	8000.

TIME	EOP STOR	AVG IN	EOP OUT
0 10	2.	1.	1.
0 20	2.	3.	1.
0 30	2.	5.	1.
0 40	2.	7.	1.
0 50	2.	9.	1.
0 60	2.	10.	1.
1 10	2.	11.	1.
1 20	3.	12.	1.
1 30	3.	12.	1.
1 40	3.	12.	1.
1 50	3.	12.	1.
1 60	3.	12.	1.
2 10	3.	12.	1.
2 20	4.	16.	1.
2 30	4.	28.	1.
2 40	5.	49.	1.
2 50	6.	79.	2.
2 60	7.	113.	2.
3 10	9.	144.	3.
3 20	11.	168.	3.
3 30	14.	186.	4.
3 40	17.	197.	5.
3 50	19.	203.	6.
3 60	22.	204.	6.
4 10	25.	210.	7.
4 20	28.	227.	8.
4 30	31.	256.	9.
4 40	35.	296.	10.
4 50	40.	338.	11.
4 60	45.	372.	13.
5 10	50.	402.	14.
5 20	56.	429.	16.
5 30	62.	454.	18.
5 40	68.	477.	19.
5 50	75.	497.	22.
5 60	81.	513.	26.
6 10	88.	529.	29.
6 20	95.	548.	33.
6 30	103.	570.	37.
6 40	110.	595.	41.

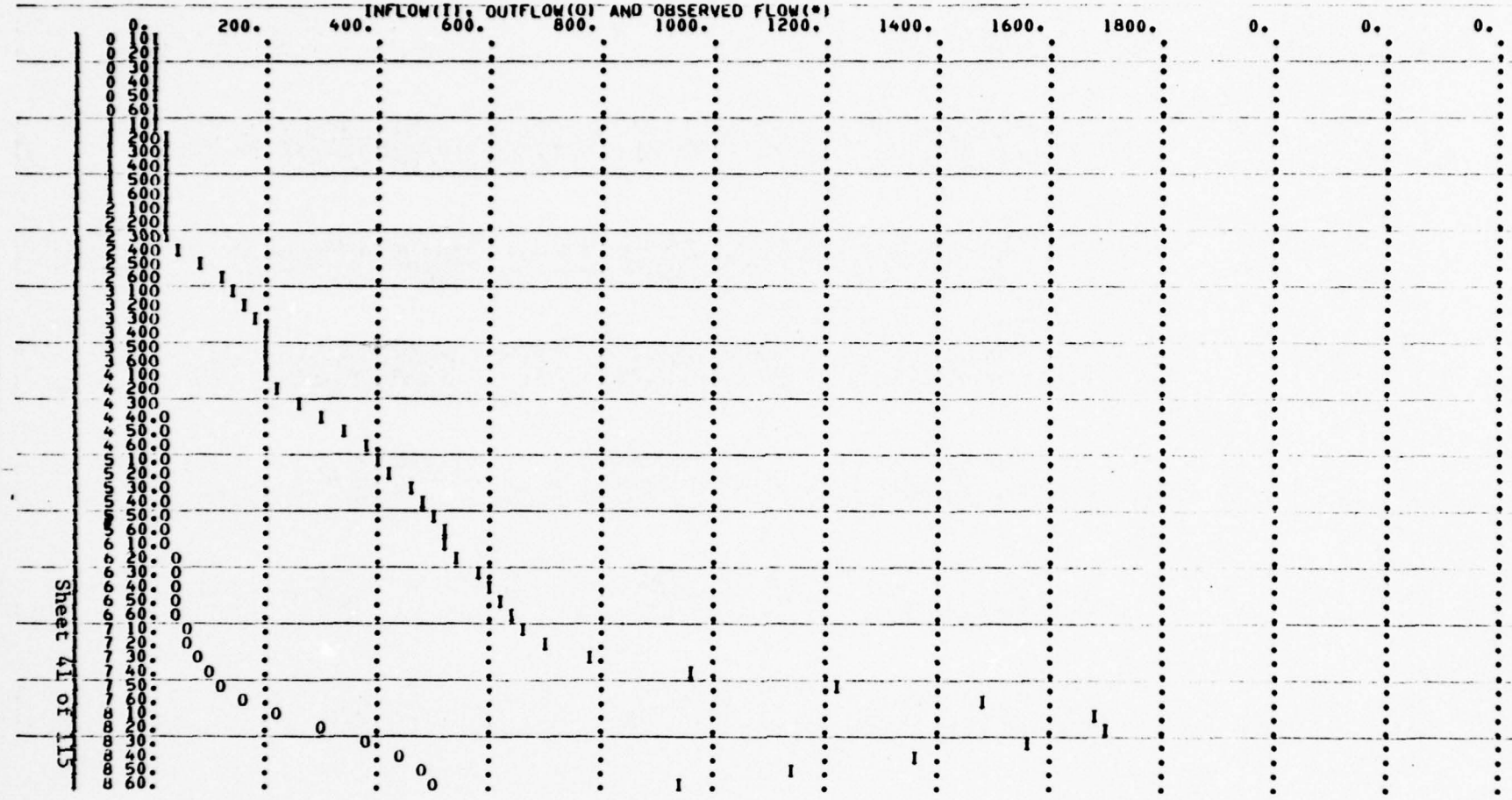
6 50	118.	620.	45.	
6 60	127.	640.	49.	
7 10	135.	664.	57.	
7 20	144.	708.	67.	
7 30	154.	783.	79.	
7 40	166.	959.	93.	
7 50	181.	1220.	112.	
7 60	200.	1474.	151.	
8 10	220.	1677.	217.	
8 20	240.	1703.	304.	
8 30	257.	1555.	377.	
8 40	270.	1353.	434.	
8 50	279.	1138.	475.	
8 60	285.	939.	502.	
9 10	289.	763.	518.	
9 20	291.	652.	525.	
9 30	292.	603.	530.	
9 40	292.	569.	532.	
9 50	292.	542.	533.	
9 60	292.	521.	532.	
10 10	292.	494.	530.	
10 20	291.	452.	525.	
10 30	289.	395.	518.	
10 40	286.	322.	506.	
10 50	283.	249.	491.	
10 60	279.	190.	474.	
11 10	274.	143.	454.	
11 20	270.	110.	434.	
11 30	265.	90.	414.	
11 40	261.	83.	395.	
11 50	257.	83.	377.	
11 60	253.	83.	359.	
12 10	249.	81.	343.	
12 20	245.	75.	327.	
12 30	242.	65.	312.	
12 40	238.	50.	297.	
12 50	235.	35.	281.	
12 60	231.	22.	266.	
13 10	228.	12.	251.	
13 20	225.	6.	237.	
13 30	222.	1.	223.	
13 40	219.	0.	210.	
13 50	216.	0.	198.	
13 60	213.	0.	186.	
14 10	211.	0.	176.	
14 20	208.	0.	169.	
14 30	206.	0.	164.	
14 40	204.	0.	160.	
14 50	202.	0.	155.	
14 60	199.	0.	151.	
SUM			16075.	

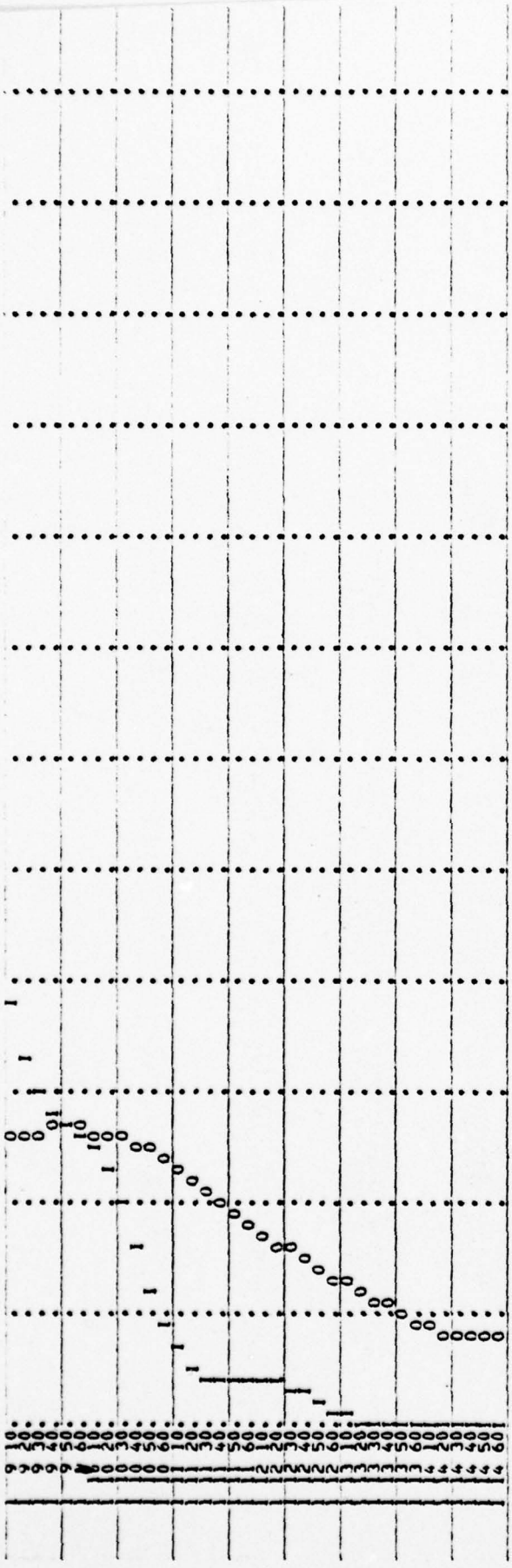
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	533.	391.	179.	179.	16075.
INCHES		3.50	3.99	3.99	3.99
AC-FT		194.	222.	222.	222.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)





NAO

RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	1760.	736.	337.	337.	1.04
ROUTED TO	1	533.	391.	179.	179.	1.04

****
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****

FLOOD ROUTING THROUGH GLEN WILD LAKE
WITHOUT FLASHBOARDS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
90	0	10	1	-0	-0	-0	2	-0	-0

JOPER: 3 NWT: -0

****

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	-0	-0	-0	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.04	-0.00	1.04	1.00	.200	-0	-0	-0

PRECIP DATA

NP	STORM	DAJ	DAK
72	-0.00	-0.00	-0.00

PRECIP PATTERN

.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
.06	.06	.19	.19	.19	.19	.19	.19	.19	.19
.19	.19	.19	.19	.19	.19	.38	.38	.38	.38
.47	.47	.47	.47	.38	.38	.38	.38	.38	.38
.58	.58	.88	1.05	1.31	3.33	1.23	.58	.58	.58
.54	.54	.54	.54	.42	.42	.42	.96	.54	.54
.09	.09	.09	.09	.09	.09	.09	.42	.42	.42
.09	.09						.09	.09	.09

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	1.00	.15	-0.00	.16

GIVEN UNIT GRAPH, NUHGQ= 9

201.	403.	604.	805.	671.	537.	403.	268.	134.

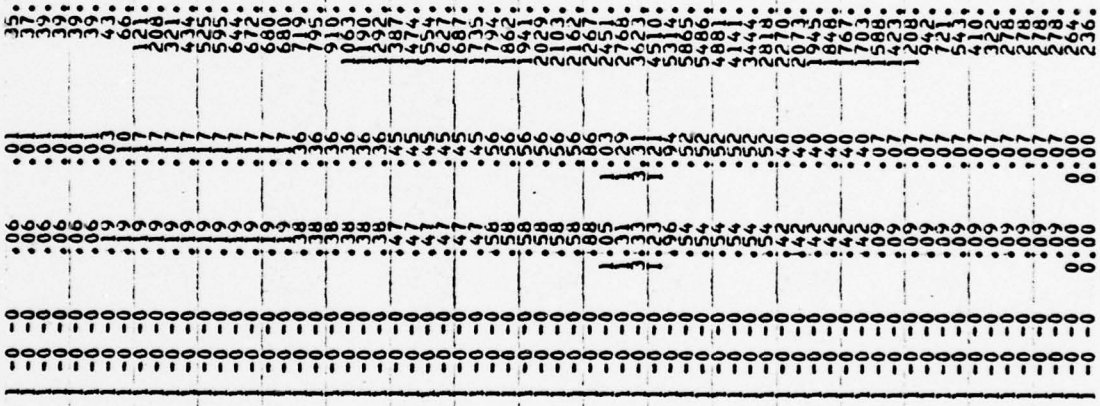
UNIT GRAPH TOTALS 4026. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME		RAIN	EXCS	COMP Q
1 -0	-0	.06	.01	2.
1 -0	-0	.06	.01	6.
1 -0	-0	.06	.01	12.
1 -0	-0	.06	.01	19.
1 -0	-0	.06	.01	26.
1 -0	-0	.06	.01	31.

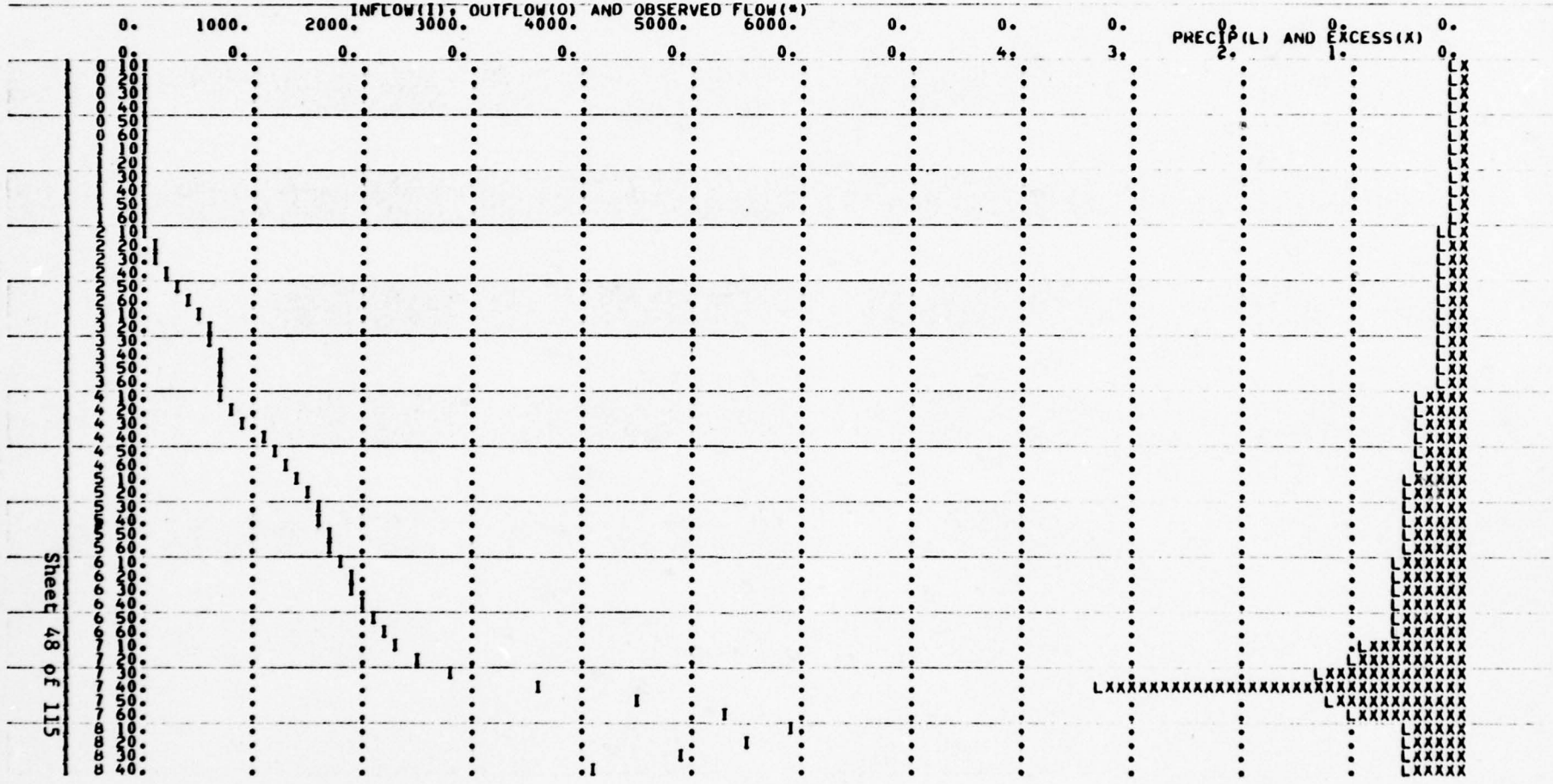


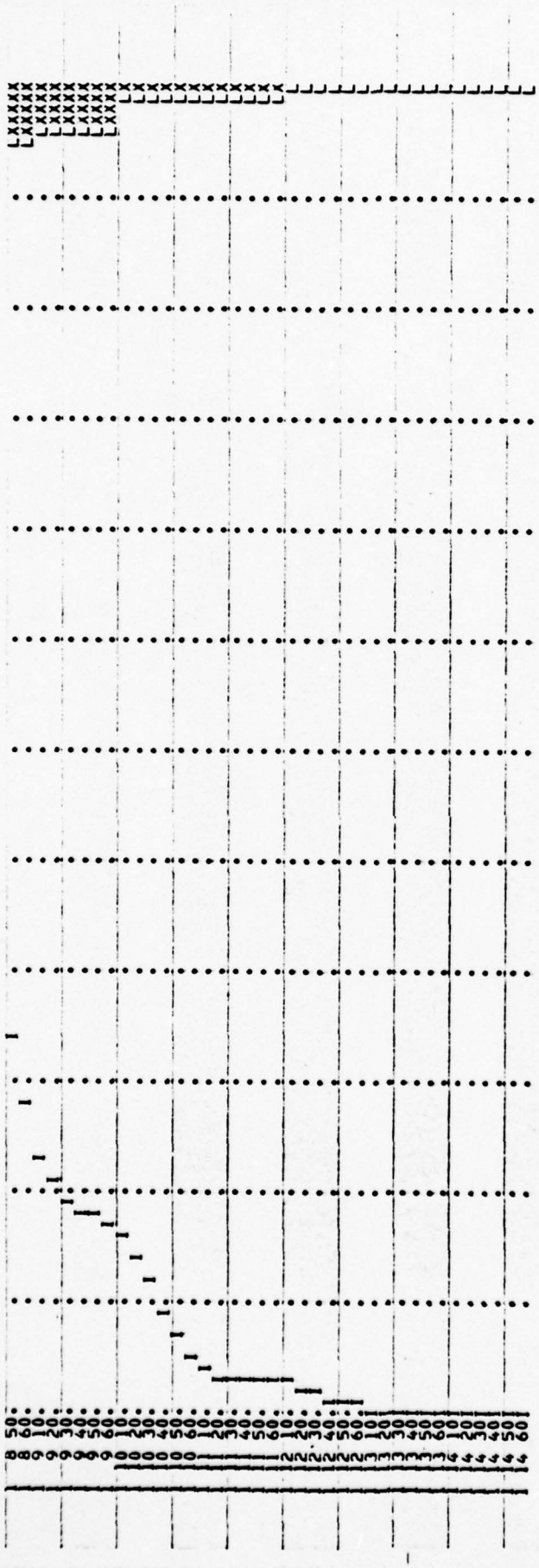
-0	-0	0.00	0.00	194.
-0	-0	0.00	0.00	139.
-0	-0	0.00	0.00	93.
-0	-0	0.00	0.00	56.
-0	-0	0.00	0.00	28.
-0	-0	0.00	0.00	9.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
	SUM	27.18	25.17	101099.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5865.	2453.	1123.	1123.	101097.
INCHES		21.94	25.12	25.12	25.12
AC-FT		1217.	1393.	1393.	1393.

OVF

STATION 1





OVN

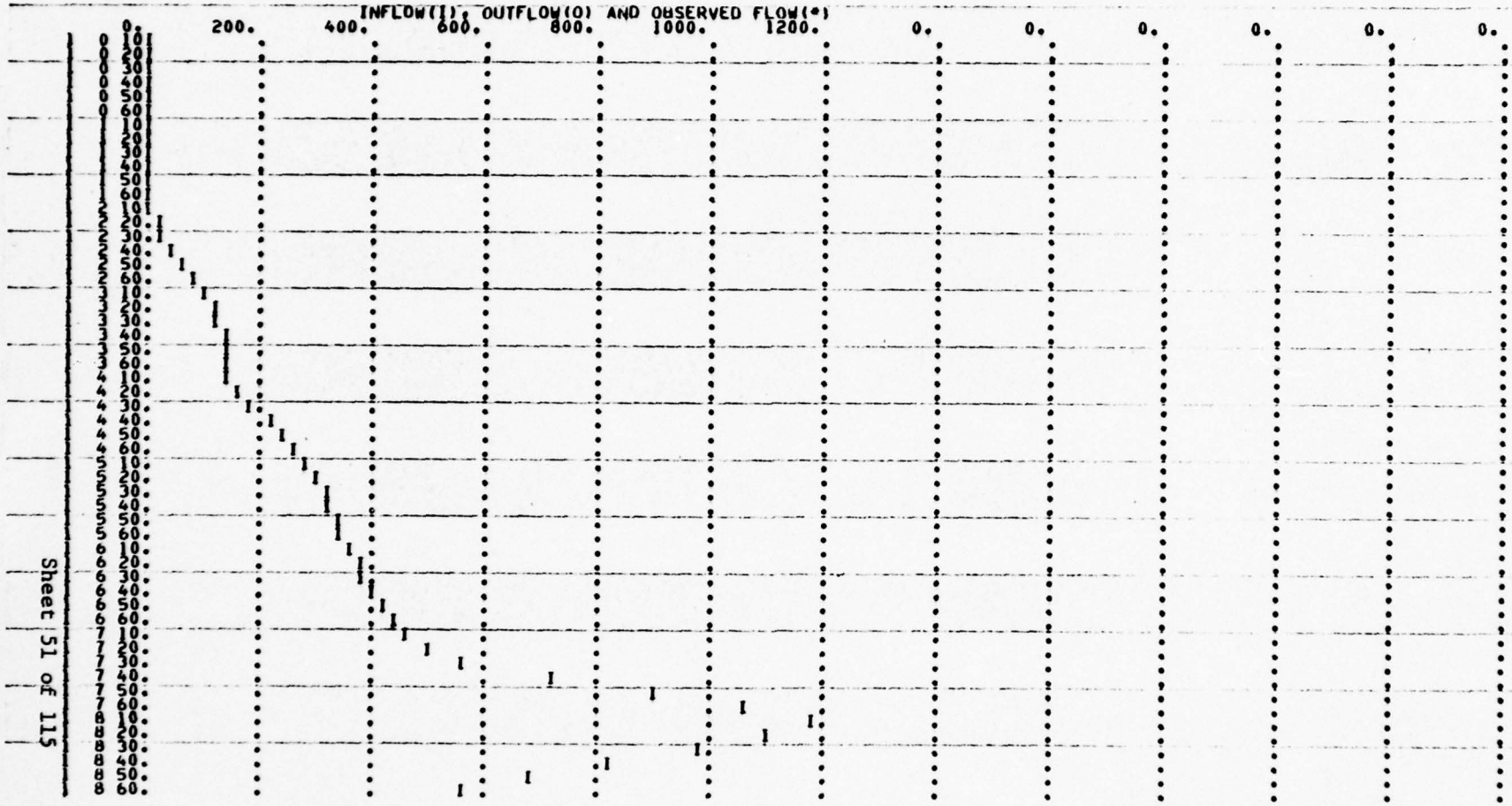
RUNOFF MULTIPLIED BY .20

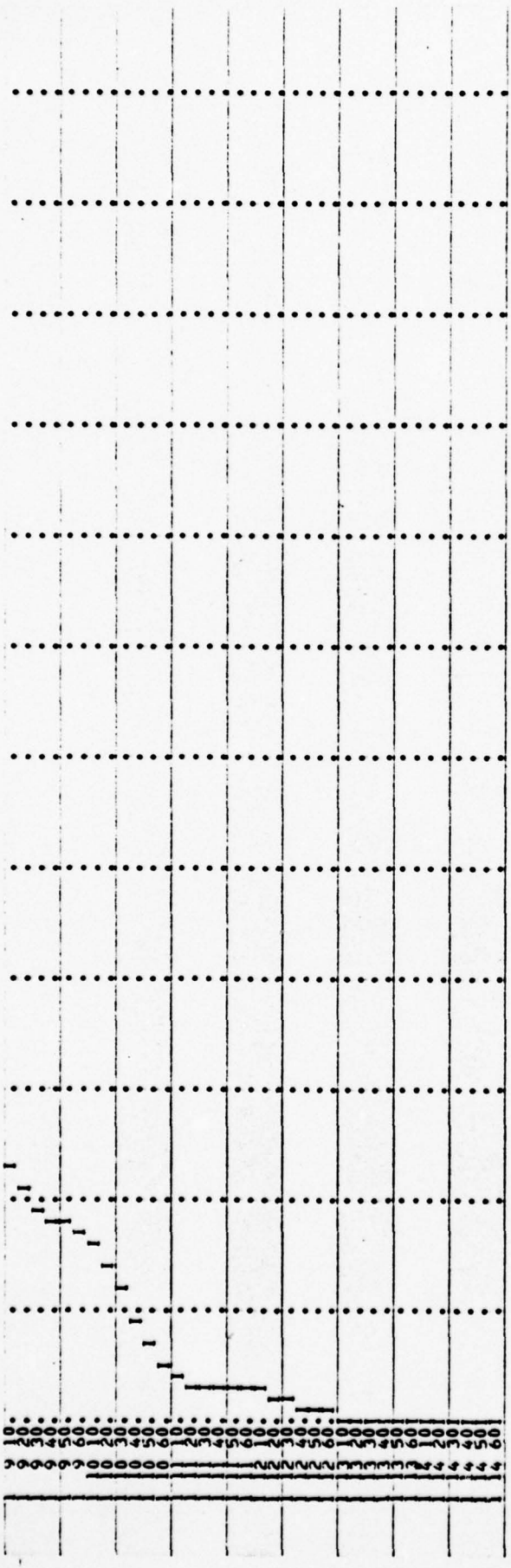
0:	1:	2:	3:	4:	5:	6:	7:	7:	8:	8:
8:	8:	9:	13:	24:	42:	64:	87:	105:	119:	
129:	134:	136:	136:	144:	159:	182:	213:	238:	258:	
277:	295:	311:	325:	337:	347:	359:	372:	388:	406:	
421:	432:	453:	490:	554:	725:	902:	1063:	1173:	1097:	
976:	828:	689:	564:	454:	415:	389:	370:	353:	341:	
318:	285:	242:	188:	144:	109:	82:	64:	56:	56:	
56:	56:	53:	47:	39:	28:	19:	11:	6:	2:	
0:	0:	0:	0:	0:	0:	0:	0:	0:	0:	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1173.	491.	225.	225.	20219.
INCHES		4.39	5.02	5.02	5.02
AC-FT		243.	279.	279.	279.

OVF

STATION 1





OVN

HYDROGRAPH ROUTING

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	-0	-0	-0	-0	-0

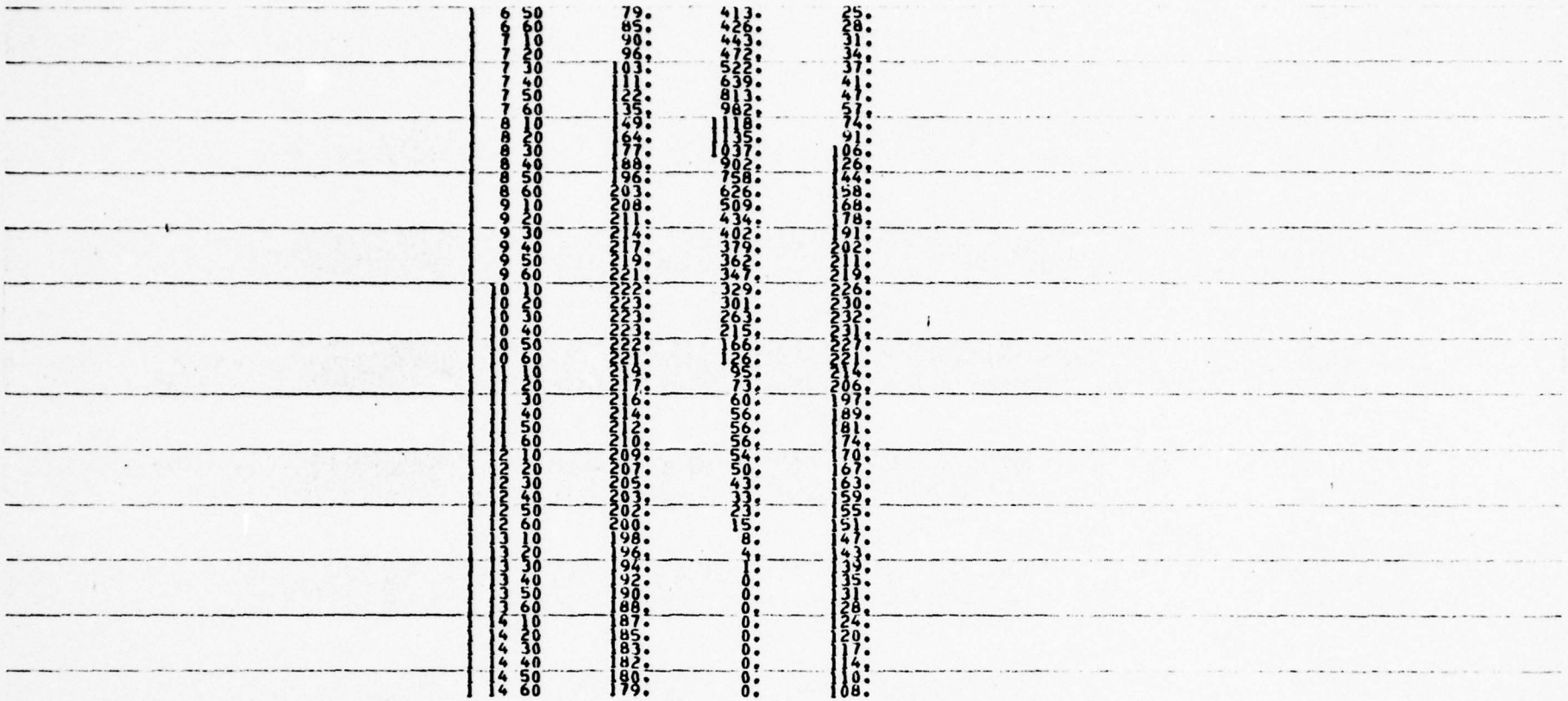
ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
-0	-0	-0	-0.000	-0.000	-0.000	-1.

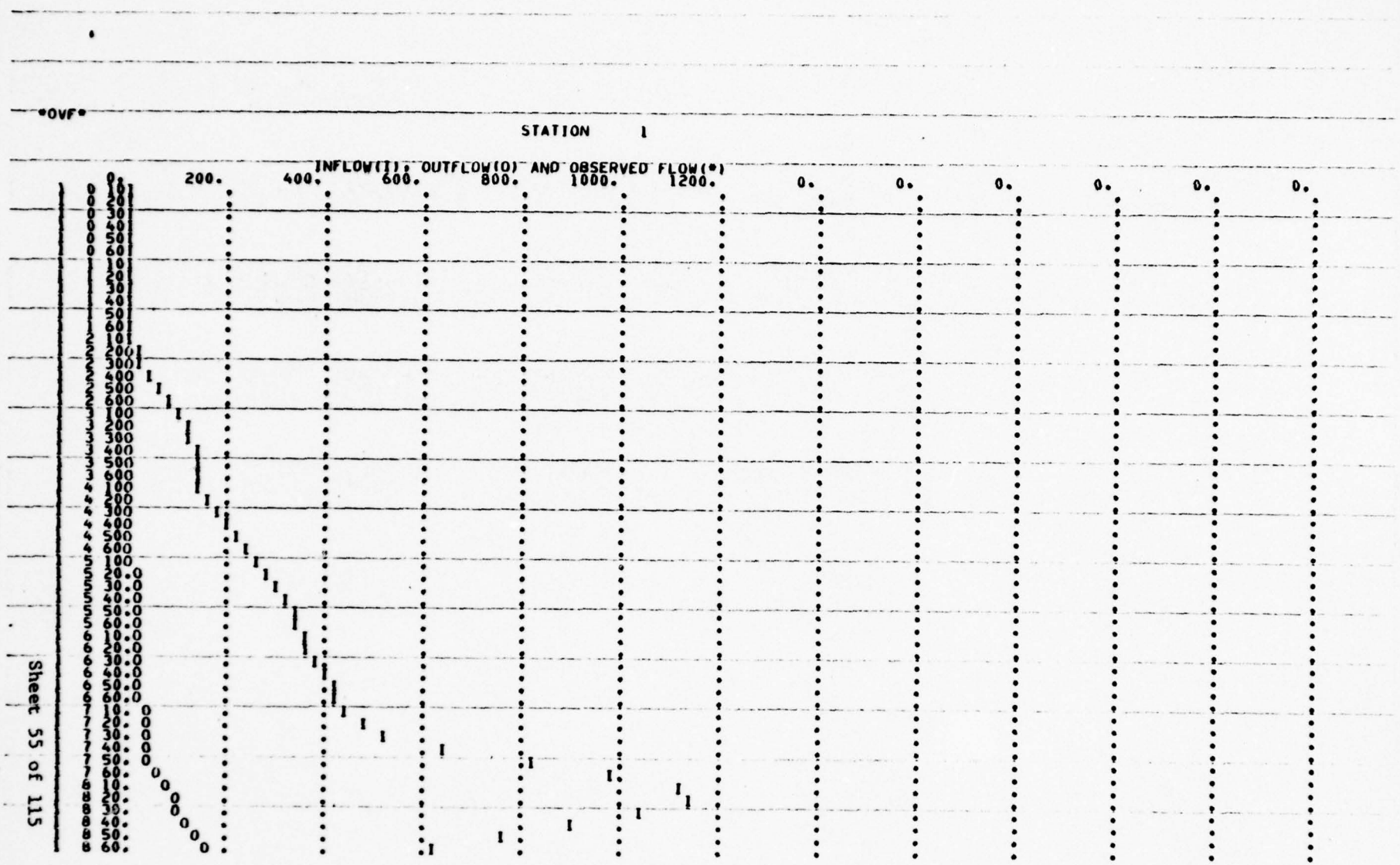
STORAGE=	0:	70:	130:	180:	210:	310:	370:	450:	550:	740:	
OUTFLOW=	0:	20:	51:	110:	173:	610:	1040:	2040:	3660:	8000:	

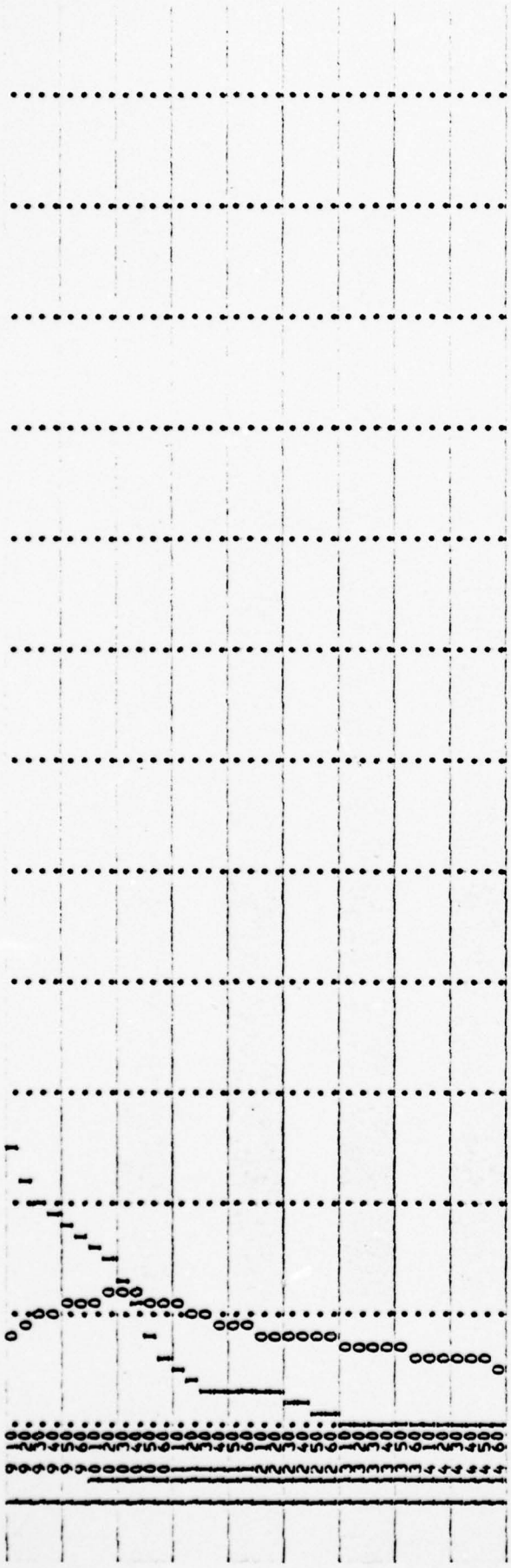
TIME	EOP STOR	AVG IN	EOP OUT
0 10	1.	0.	0.
0 20	1.	1.	0.
0 30	1.	2.	0.
0 40	1.	3.	0.
0 50	1.	5.	0.
0 60	2.	6.	0.
1 10	2.	7.	0.
1 20	2.	7.	0.
1 30	2.	8.	1.
1 40	2.	8.	1.
1 50	2.	8.	1.
1 60	2.	8.	1.
2 10	2.	8.	1.
2 20	2.	11.	1.
2 30	3.	19.	1.
2 40	3.	33.	1.
2 50	4.	53.	1.
2 60	5.	75.	1.
3 10	6.	96.	2.
3 20	8.	112.	5.
3 30	9.	124.	3.
3 40	11.	132.	3.
3 50	13.	135.	4.
3 60	15.	136.	4.
4 10	17.	140.	5.
4 20	19.	151.	5.
4 30	21.	171.	6.
4 40	23.	197.	7.
4 50	26.	225.	8.
4 60	30.	248.	9.
5 10	33.	268.	10.
5 20	37.	286.	11.
5 30	41.	303.	12.
5 40	45.	318.	13.
5 50	50.	331.	14.
5 60	54.	342.	16.
6 10	59.	353.	17.
6 20	64.	366.	18.
6 30	69.	380.	20.
6 40	74.	397.	22.



6 50	79.	413.	25.
6 60	85.	426.	28.
7 10	90.	443.	31.
7 20	96.	472.	34.
7 30	103.	522.	37.
7 40	111.	639.	41.
7 50	122.	813.	47.
7 60	135.	982.	57.
8 10	149.	1118.	74.
8 20	164.	1135.	91.
8 30	177.	1037.	106.
8 40	188.	902.	126.
8 50	196.	758.	144.
8 60	203.	626.	158.
9 10	208.	509.	168.
9 20	211.	434.	178.
9 30	214.	402.	191.
9 40	217.	379.	202.
9 50	219.	362.	211.
9 60	221.	347.	219.
10 10	222.	329.	226.
10 20	223.	301.	230.
10 30	223.	263.	232.
10 40	223.	215.	231.
10 50	222.	166.	227.
10 60	221.	126.	221.
11 10	219.	95.	214.
11 20	217.	73.	206.
11 30	216.	60.	197.
11 40	214.	56.	189.
11 50	212.	56.	181.
11 60	210.	56.	174.
12 10	209.	54.	170.
12 20	207.	50.	167.
12 30	205.	43.	163.
12 40	203.	33.	159.
12 50	202.	23.	155.
12 60	200.	15.	151.
13 10	198.	8.	147.
13 20	196.	4.	143.
13 30	194.	1.	139.
13 40	192.	0.	135.
13 50	190.	0.	131.
13 60	188.	0.	128.
14 10	187.	0.	124.
14 20	185.	0.	120.
14 30	183.	0.	117.
14 40	182.	0.	114.
14 50	180.	0.	110.
14 60	179.	0.	108.
SUM			7397.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	232.	174.	82.	82.	7397.
INCHES		1.56	1.84	1.84	1.84
AC-FT		86.	102.	102.	102.


OVF
STATION 1
INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
0.
200.
400.
600.
800.
1000.
1200.
0.
0.
0.
0.
0.
0.



VAO

RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	1173.	491.	225.	225.	1.04
ROUTED TO	1	232.	174.	82.	82.	1.04

****
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****

FLOOD ROUTING THROUGH GLEN WILD LAKE
WITH FLASHBOARDS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLI	IPRT	NSTAN
90	0	10	1	-0	-0	-0	2	-0	-0

JOPER	NWT
3	-0

****

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	-0	-0	-0	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.04	-0.00	1.04	1.00	.500	-0	-0	-0

PRECIP DATA

NP	STORM	DAJ	DAK
72	-0.00	-0.00	-0.00

PRECIP PATTERN

.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
.06	.06	.19	.19	.19	.19	.19	.19	.19	.19
.19	.19	.19	.19	.38	.38	.38	.38	.38	.38
.47	.47	.47	.47	.47	.47	.58	.58	.58	.58
.58	.58	.88	1.05	1.31	3.33	1.23	.96	.54	.54
.54	.54	.54	.54	.42	.42	.42	.42	.42	.42
.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
.09	.09								

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	1.00	.15	-0.00	.16

GIVEN UNIT GRAPH, NUMGQ= 9

201. 403. 604. 805. 671. 537. 403. 268. 134.

UNIT GRAPH TOTALS 4026. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

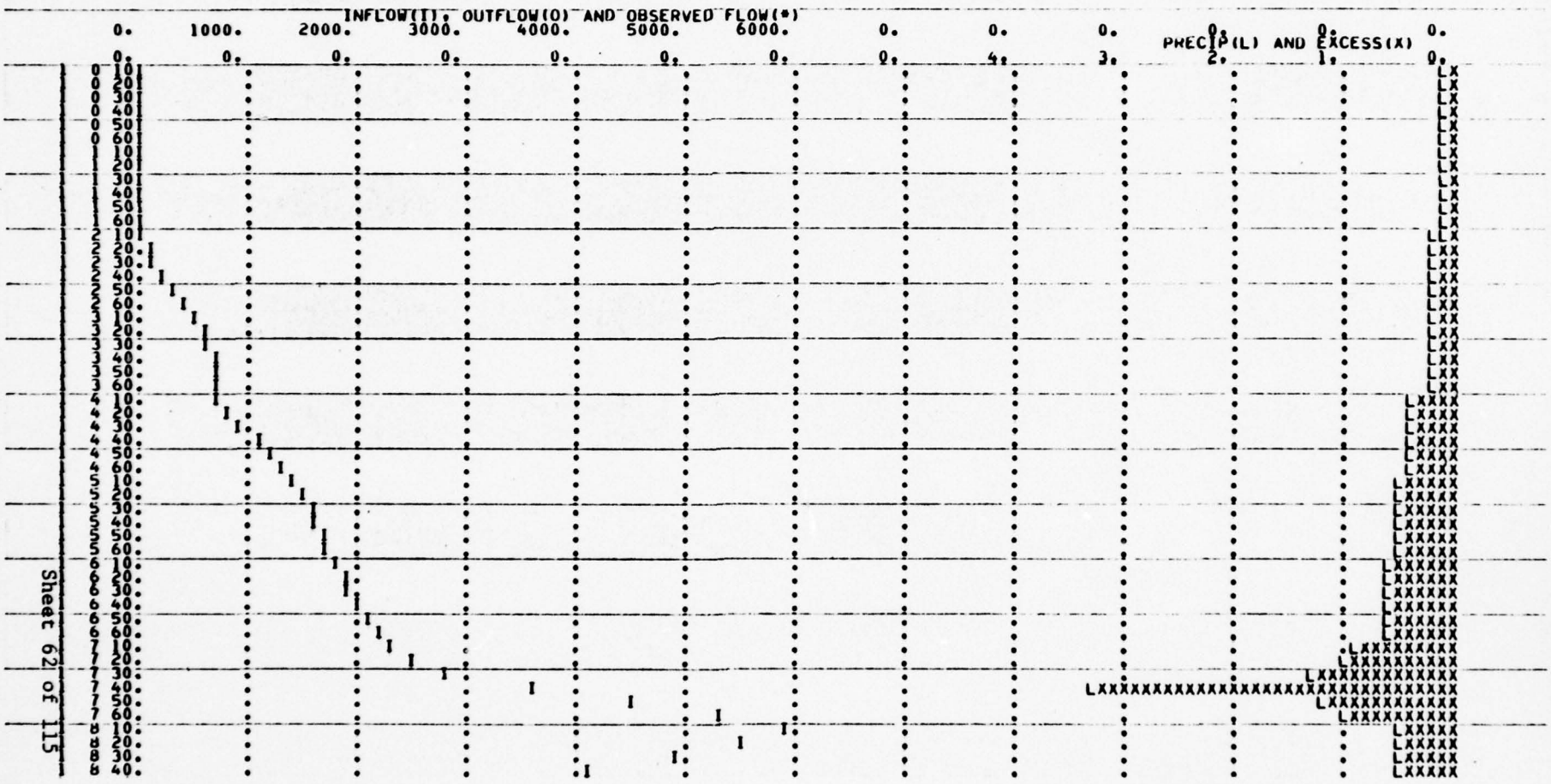
TIME		RAIN	EXCS	COMP Q
-0	-0	.06	.01	2.
-0	-0	.06	.01	6.
-0	-0	.06	.01	12.
-0	-0	.06	.01	19.
-0	-0	.06	.01	26.
-0	-0	.06	.01	31.

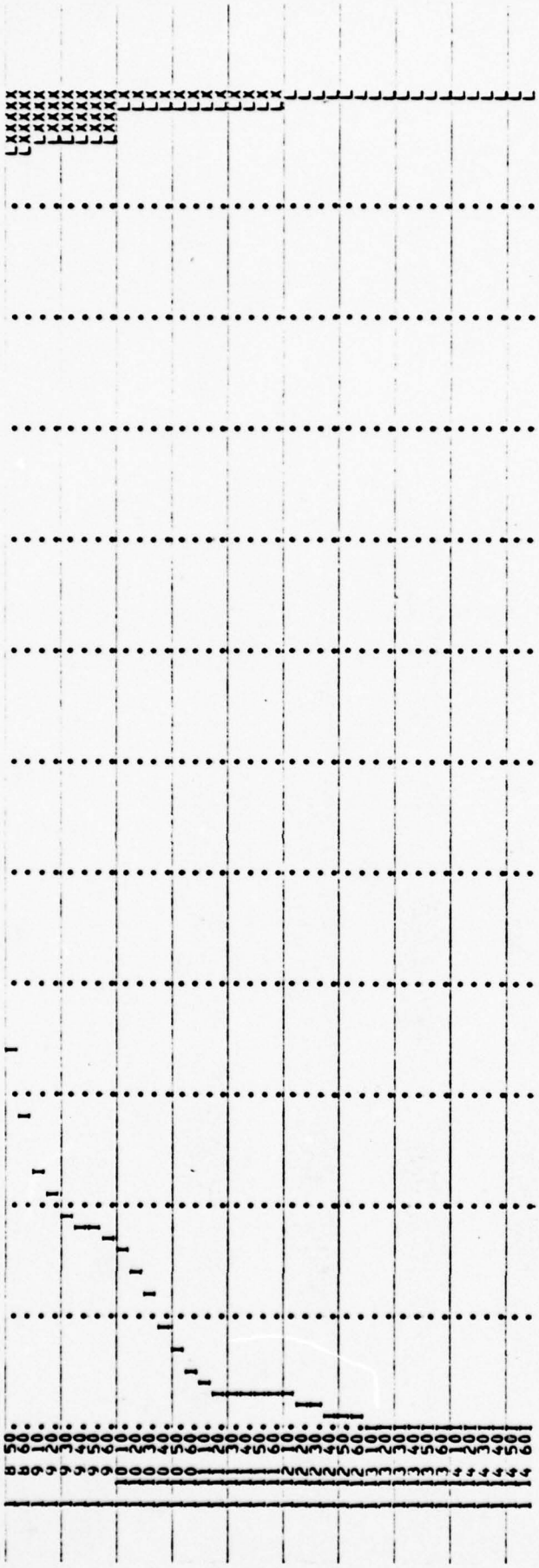
-0	-0	0.00	0.00	194.	
-0	-0	0.00	0.00	139.	
-0	-0	0.00	0.00	93.	
-0	-0	0.00	0.00	56.	
-0	-0	0.00	0.00	28.	
-0	-0	0.00	0.00	9.	
-0	-0	0.00	0.00	0.	
-0	-0	0.00	0.00	0.	
-0	-0	0.00	0.00	0.	
-0	-0	0.00	0.00	0.	
-0	-0	0.00	0.00	0.	
-0	-0	0.00	0.00	0.	
-0	-0	0.00	0.00	0.	
-0	-0	0.00	0.00	0.	
-0	-0	0.00	0.00	0.	
-0	-0	0.00	0.00	0.	
SUM		27.18	25.17	101099.	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5865.	2453.	1123.	1123.	101097.
INCHES		21.94	25.12	25.12	25.12
AC-FT		1217.	1393.	1393.	1393.

OVF

STATION 1



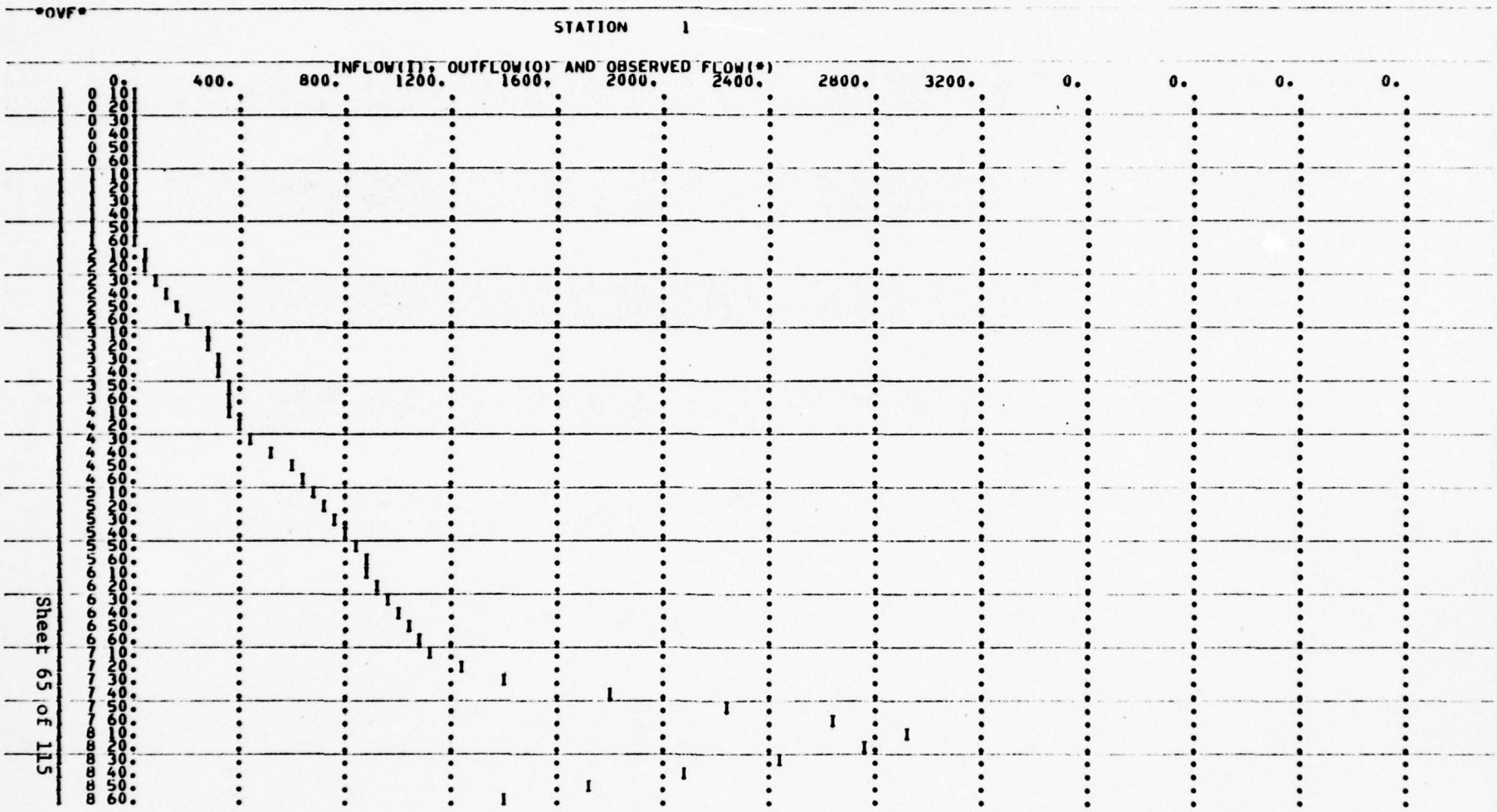


OVN

RUNOFF MULTIPLIED BY .50

1.	3.	6.	10.	13.	15.	17.	19.	19.	19.
19.	19.	21.	33.	61.	104.	160.	217.	263.	298.
322.	336.	340.	340.	359.	398.	455.	531.	595.	646.
694.	737.	777.	813.	843.	868.	897.	931.	970.	1015.
1051.	1081.	1133.	1226.	1384.	1811.	2255.	2657.	2933.	2743.
2441.	2070.	1722.	1409.	1135.	1037.	972.	924.	884.	851.
794.	712.	604.	471.	360.	272.	205.	161.	139.	139.
139.	139.	132.	118.	97.	69.	46.	28.	14.	5.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2933.	1226.	562.	562.	50548.
INCHES		10.91	12.56	12.56	12.56
AC-FT		608.	697.	697.	697.


OVF
STATION 1
INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
0. 400. 800. 1200. 1600. 2000. 2400. 2800. 3200. 0. 0. 0. 0.

OVN

HYDROGRAPH ROUTING

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	-0	-0	-0	-0	-0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
-0	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	0.	27.	79.	108.	199.	260.	350.	440.	630.	-0.
OUTFLOW=	0.	4.	44.	100.	510.	930.	1910.	3500.	7800.	-0.

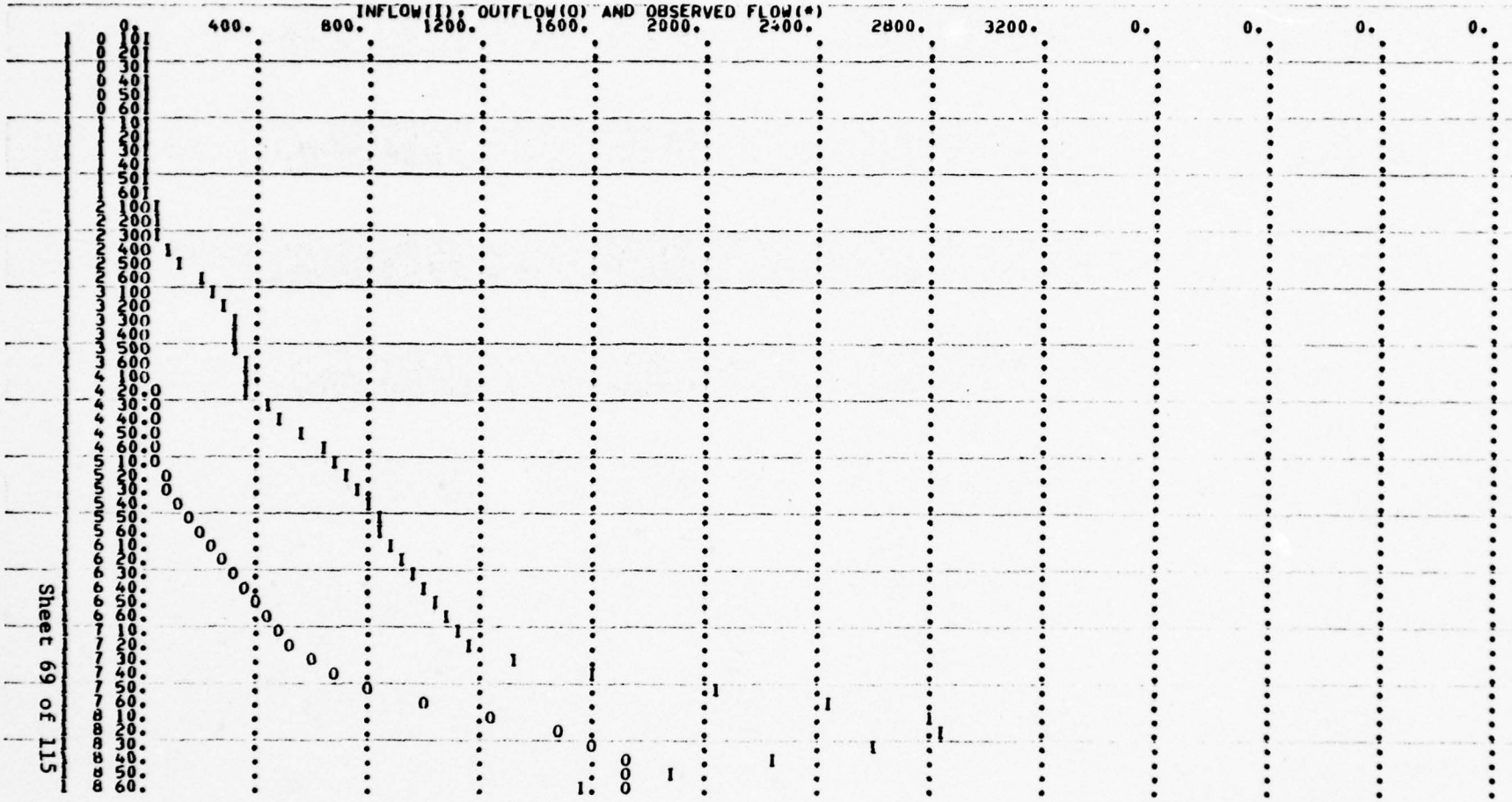
TIME	EOP STOR	AVG IN	EOP OUT
0 10	7.	1.	1.
0 20	7.	2.	1.
0 30	7.	4.	1.
0 40	7.	8.	1.
0 50	7.	11.	1.
0 60	7.	14.	1.
1 10	7.	16.	1.
1 20	7.	18.	1.
1 30	8.	19.	1.
1 40	8.	19.	1.
1 50	8.	19.	1.
1 60	8.	19.	1.
2 10	9.	20.	1.
2 20	9.	27.	1.
2 30	10.	47.	1.
2 40	11.	82.	2.
2 50	13.	132.	2.
2 60	15.	189.	2.
3 10	18.	240.	3.
3 20	22.	280.	3.
3 30	26.	310.	4.
3 40	31.	329.	7.
3 50	35.	338.	10.
3 60	40.	340.	14.
4 10	45.	350.	18.
4 20	50.	378.	21.
4 30	55.	426.	26.
4 40	61.	493.	31.
4 50	69.	563.	36.
4 60	77.	621.	42.
5 10	85.	670.	56.
5 20	94.	715.	74.
5 30	104.	757.	91.
5 40	113.	795.	123.
5 50	122.	828.	165.
5 60	132.	856.	207.
6 10	141.	882.	247.
6 20	150.	914.	288.
6 30	158.	951.	327.
6 40	167.	992.	367.

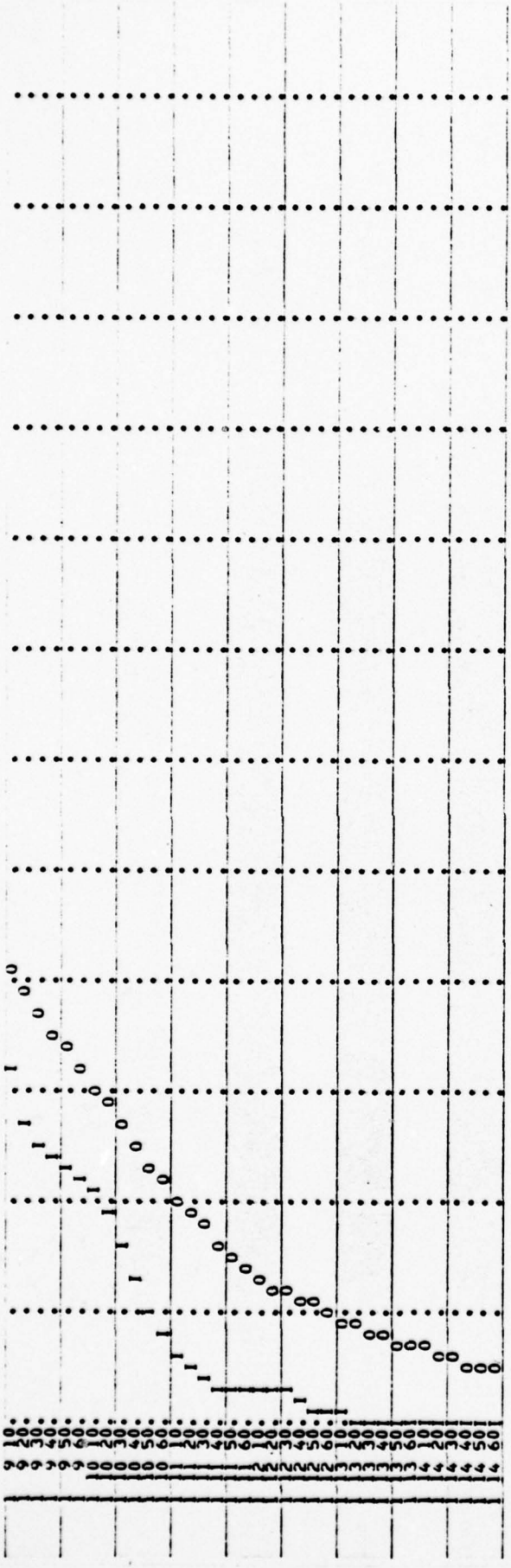
6	50	176.	1033.	408.
6	60	185.	1066.	447.
7	10	194.	1107.	487.
7	20	203.	1179.	538.
7	30	213.	1305.	607.
7	40	226.	1598.	697.
7	50	244.	2033.	818.
7	60	265.	2456.	986.
8	10	288.	2795.	1238.
8	20	309.	2838.	1462.
8	30	323.	2592.	1619.
8	40	331.	2256.	1708.
8	50	334.	1896.	1734.
8	60	332.	1565.	1711.
9	10	326.	1272.	1650.
9	20	319.	1086.	1571.
9	30	312.	1004.	1492.
9	40	305.	948.	1416.
9	50	298.	904.	1345.
9	60	292.	868.	1278.
10	10	286.	823.	1214.
10	20	280.	753.	1150.
10	30	274.	658.	1081.
10	40	267.	537.	1005.
10	50	259.	416.	926.
10	60	251.	316.	870.
11	10	243.	238.	813.
11	20	235.	183.	756.
11	30	227.	150.	701.
11	40	219.	139.	650.
11	50	213.	139.	604.
11	60	207.	139.	562.
12	10	201.	135.	523.
12	20	196.	125.	495.
12	30	190.	108.	472.
12	40	185.	83.	448.
12	50	180.	58.	425.
12	60	175.	37.	401.
13	10	170.	21.	378.
13	20	165.	9.	356.
13	30	160.	2.	335.
13	40	156.	0.	315.
13	50	151.	0.	296.
13	60	148.	0.	278.
14	10	144.	0.	261.
14	20	140.	0.	246.
14	30	137.	0.	231.
14	40	134.	0.	217.
14	50	131.	0.	204.
14	60	128.	0.	192.
		SUM		41801.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1734.	986.	464.	464.	41801.
INCHES		8.82	10.39	10.39	10.39
AC-FT		489.	576.	576.	576.

OVF

STATION 1





NAO

RUNOFF SUMMARY: AVERAGE FLOW

HYDROGRAPH AT ROUTED TO	PEAK 2933. 1734.	6-HOUR 1226. 986.	24-HOUR 562. 464.	72-HOUR 562. 464.	AREA 1.04 1.04

****
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****

FLOOD ROUTING THROUGH GLEN WILD LAKE
WITH FLASHBOARDS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
90	0	10	1	-0	-0	-0	2	-0	-0

JOPER	NWT
3	-0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	-0	-0	-0	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.04	-0.00	1.04	1.00	.400	-0	-0	-0

PRECIP DATA

NP	STORM	DAJ	DAK
72	-0.00	-0.00	-0.00

PRECIP PATTERN

.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
.06	.06	.19	.19	.19	.19	.19	.19	.19	.19
.19	.19	.19	.19	.38	.38	.38	.38	.38	.38
.47	.47	.47	.47	.47	.47	.58	.58	.58	.58
.58	.58	.88	1.05	1.31	3.33	1.23	.96	.54	.54
.54	.54	.54	.54	.42	.42	.42	.42	.42	.42
.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
.09	.09								

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	1.00	.15	-0.00	.16

GIVEN UNIT GRAPH, NUHGO= 9

201.	403.	604.	805.	671.	537.	403.	268.	134.

UNIT GRAPH TOTALS 4026. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

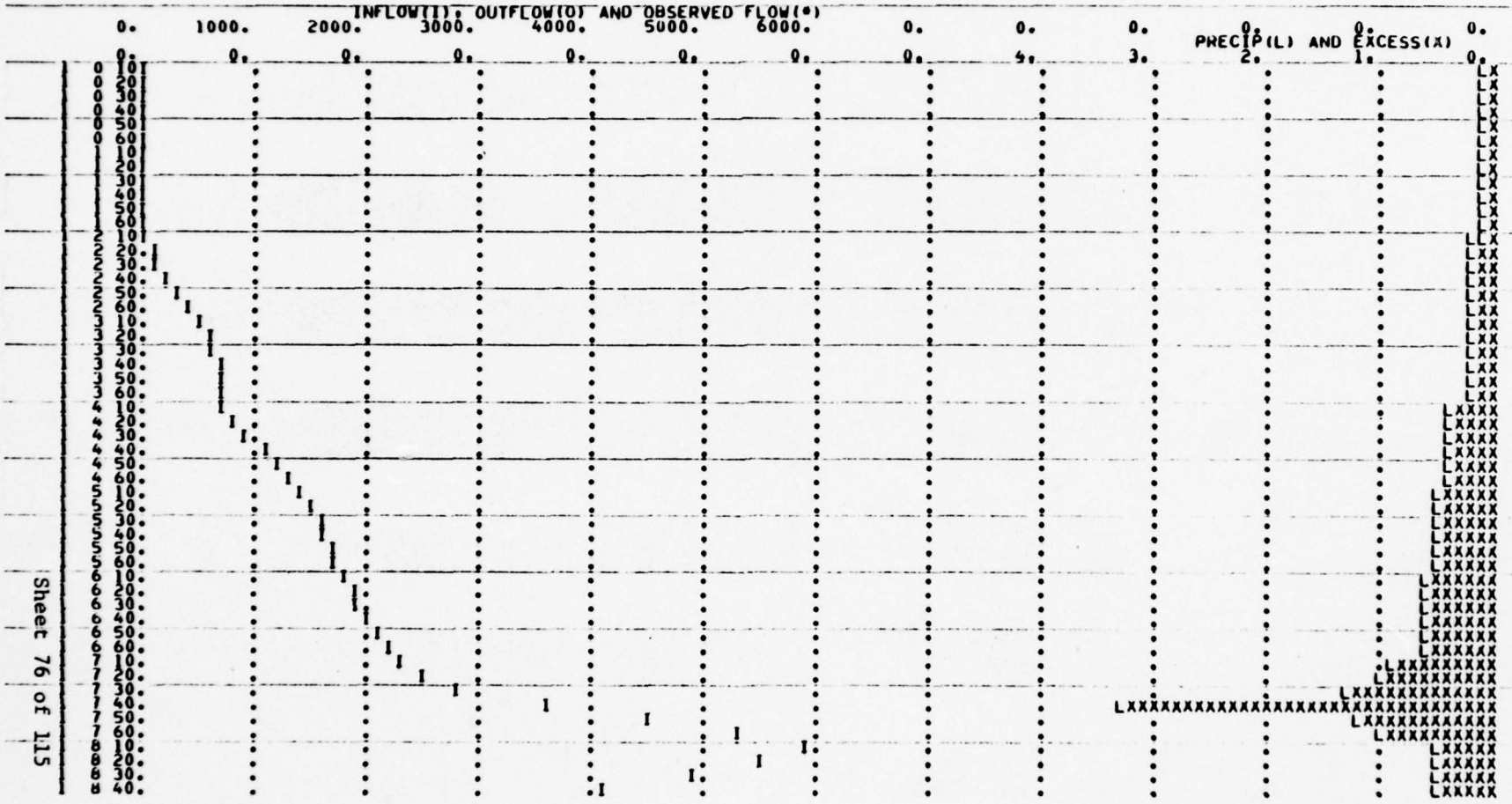
TIME		RAIN	EXCS	COMP Q
-0	-0	.06	.01	2.
-0	-0	.06	.01	6.
-0	-0	.06	.01	12.
-0	-0	.06	.01	19.
-0	-0	.06	.01	26.
-0	-0	.06	.01	31.

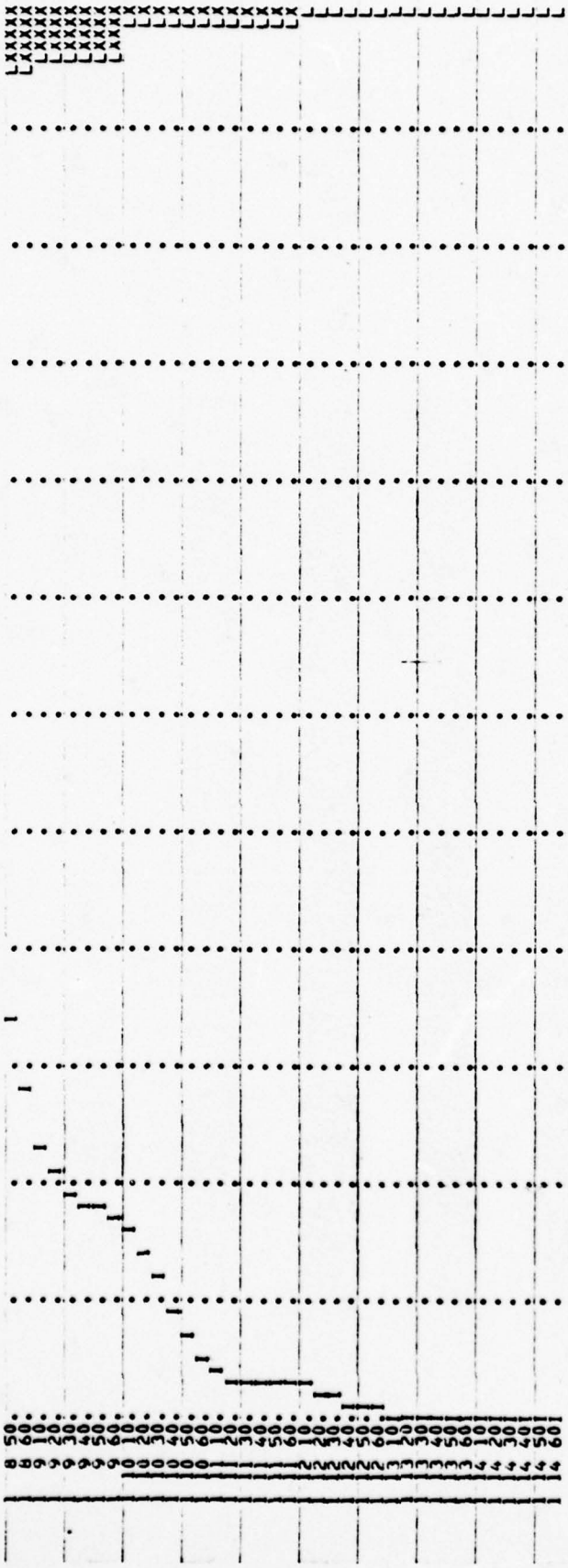
-0	-0	0.00	0.00		194.
-0	-0	0.00	0.00		139.
-0	-0	0.00	0.00		93.
-0	-0	0.00	0.00		56.
-0	-0	0.00	0.00		28.
-0	-0	0.00	0.00		9.
-0	-0	0.00	0.00		0.
-0	-0	0.00	0.00		0.
-0	-0	0.00	0.00		0.
-0	-0	0.00	0.00		0.
-0	-0	0.00	0.00		0.
-0	-0	0.00	0.00		0.
-0	-0	0.00	0.00		0.
-0	-0	0.00	0.00		0.
-0	-0	0.00	0.00		0.
-0	-0	0.00	0.00		0.
		SUM	27.18	25.17	101099.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5865.	2453.	1123.	1123.	101097.
INCHES		21.94	25.12	25.12	25.12
AC-FT		1217.	1393.	1393.	1393.

OVF

STATION 1





OVN

RUNOFF MULTIPLIED BY .40

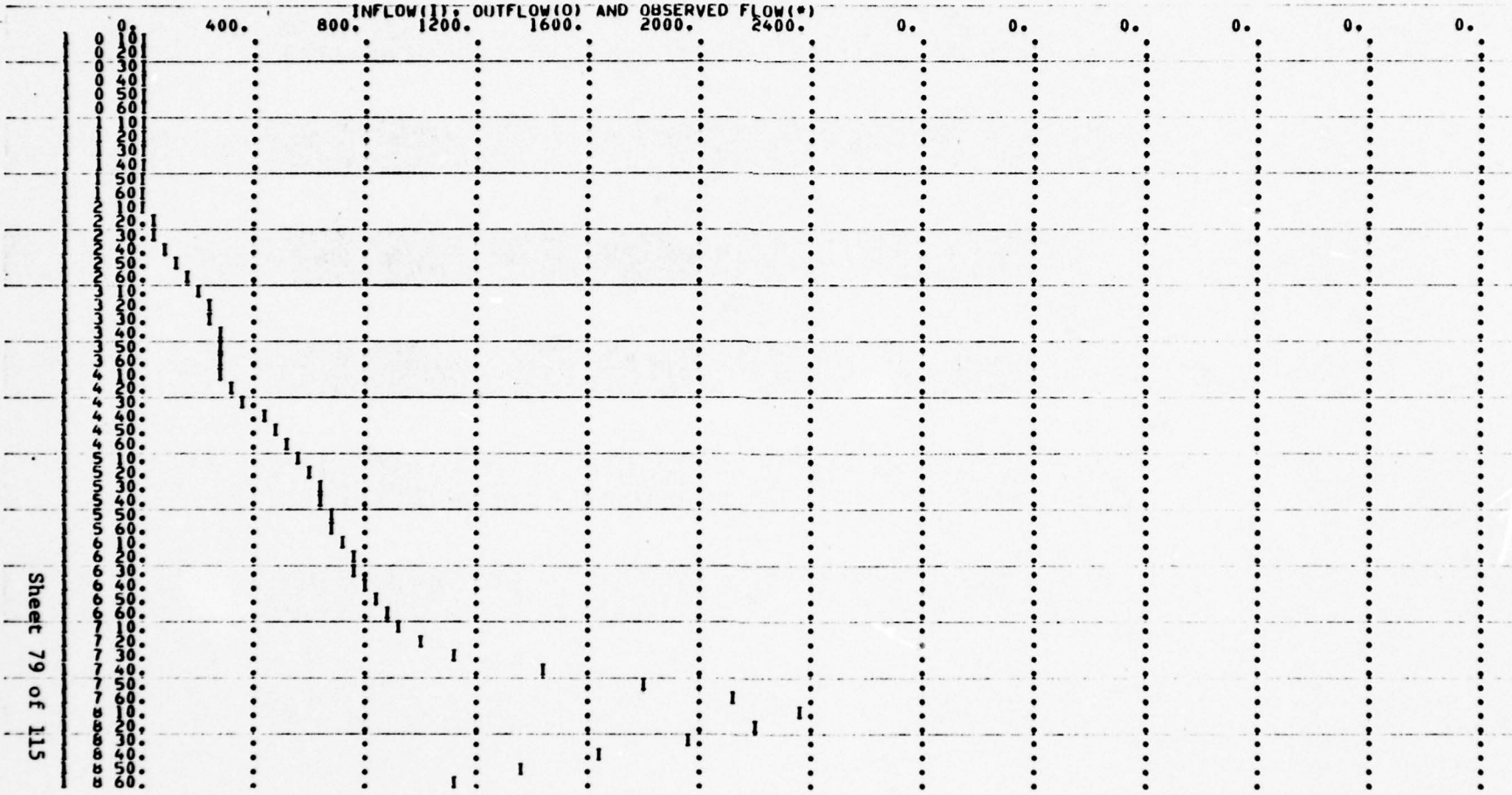
1:	2:	5:	8:	10:	12:	14:	15:	15:	15:
15:	15:	17:	26:	48:	83:	128:	173:	210:	238:
258:	269:	272:	272:	287:	318:	364:	425:	476:	517:
555:	590:	622:	651:	675:	694:	717:	745:	776:	812:
841:	865:	907:	980:	1107:	1449:	1804:	2126:	2346:	2194:
1953:	1656:	1378:	1127:	908:	829:	778:	739:	707:	681:
635:	569:	483:	377:	288:	217:	164:	129:	111:	111:
111:	111:	106:	94:	78:	56:	37:	22:	11:	4:
0:	0:	0:	0:	0:	0:	0:	0:	0:	0:

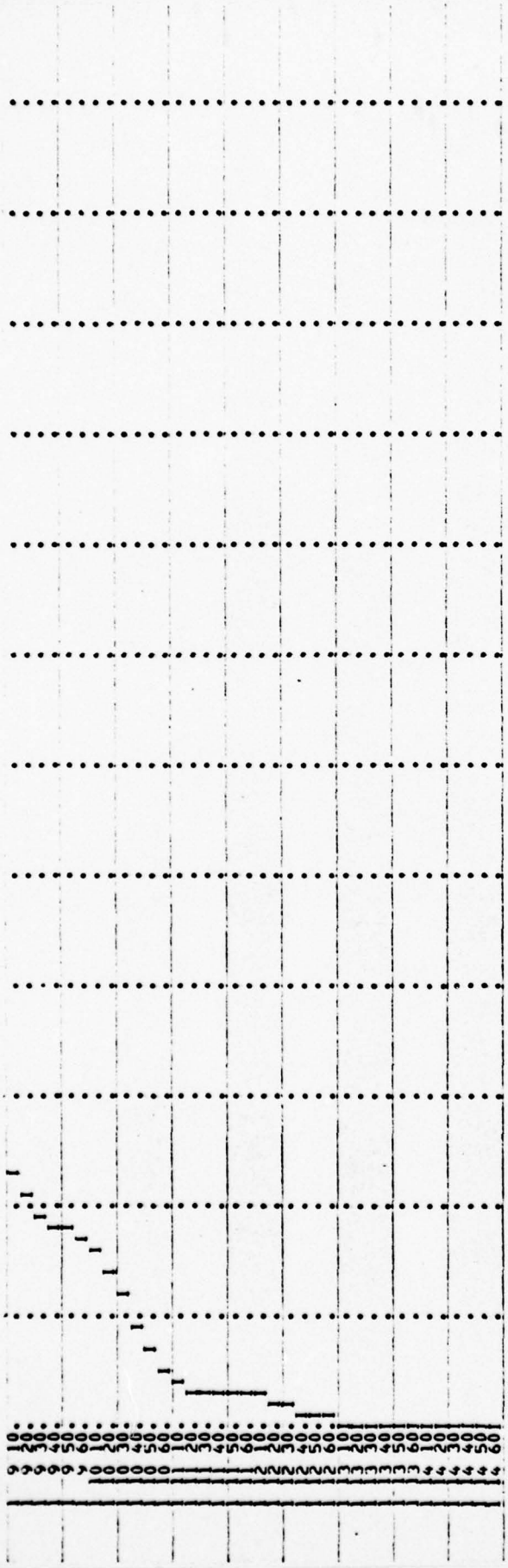
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2346.	981.	449.	449.	40439.
INCHES		8.77	10.05	10.05	10.05
AC-FT		487.	557.	557.	557.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)





OVN

HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	-0	-0	-0	-0	-0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
-0	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	0.	27.	79.	108.	199.	260.	350.	440.	630.	-0.
OUTFLOW=	0.	4.	44.	100.	510.	930.	1910.	3500.	7800.	-0.

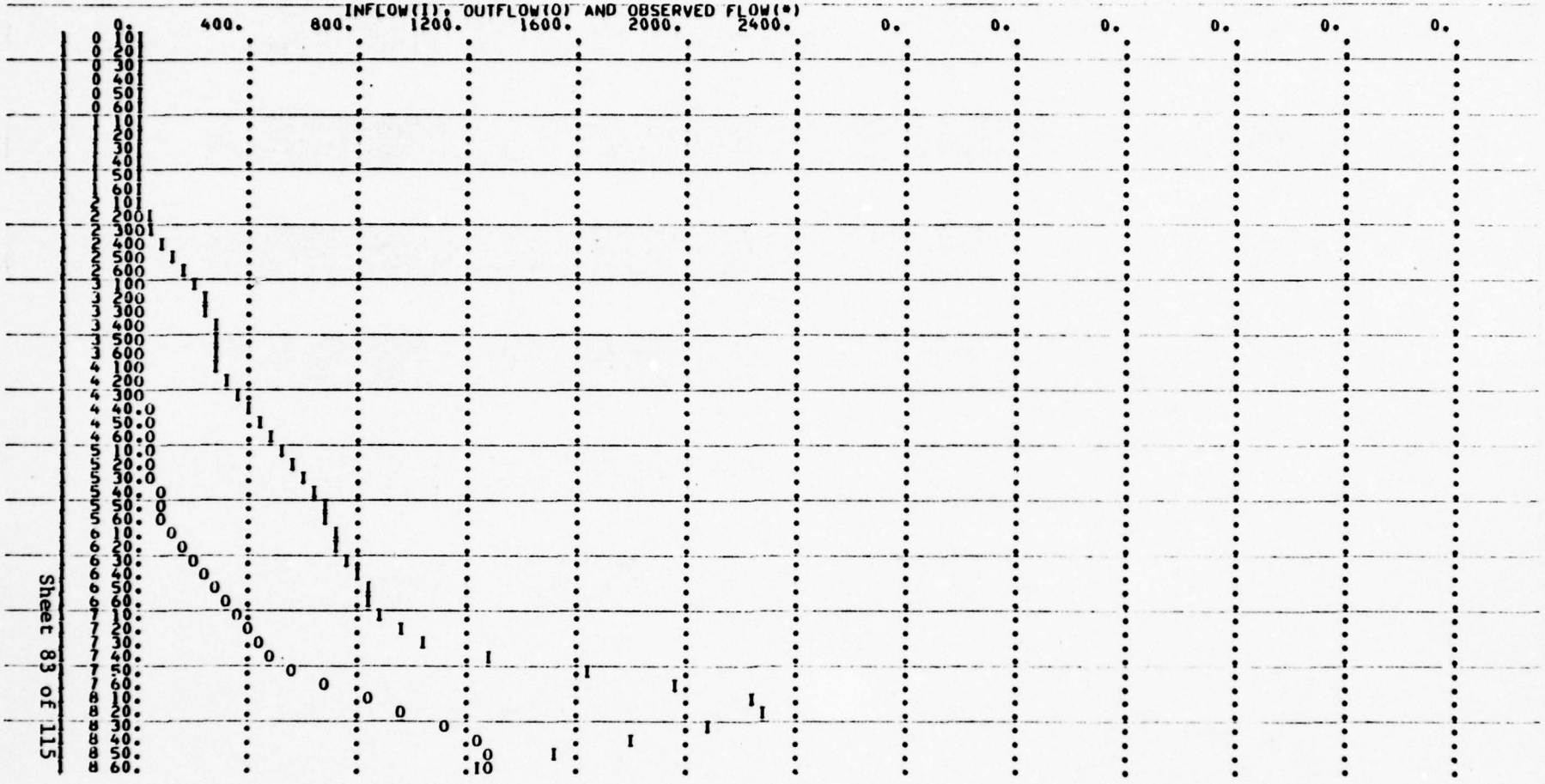
TIME	EOP STOR	AVG IN	EOP OUT
0 10	5.	1.	1.
0 20	5.	2.	1.
0 30	5.	3.	1.
0 40	5.	8.	1.
0 50	5.	9.	1.
0 60	6.	11.	1.
1 10	6.	13.	1.
1 20	6.	14.	1.
1 30	6.	15.	1.
1 40	6.	15.	1.
1 50	7.	15.	1.
1 60	7.	15.	1.
2 10	7.	16.	1.
2 20	7.	22.	1.
2 30	8.	37.	1.
2 40	9.	66.	1.
2 50	10.	106.	1.
2 60	12.	151.	2.
3 10	15.	192.	5.
3 20	18.	224.	3.
3 30	21.	248.	3.
3 40	25.	263.	4.
3 50	28.	270.	5.
3 60	32.	272.	8.
4 10	36.	280.	11.
4 20	40.	303.	14.
4 30	44.	341.	17.
4 40	49.	395.	21.
4 50	55.	451.	26.
4 60	62.	497.	31.
5 10	69.	536.	36.
5 20	76.	572.	42.
5 30	84.	606.	53.
5 40	92.	636.	68.
5 50	100.	663.	84.
5 60	108.	684.	100.
6 10	116.	706.	136.
6 20	124.	731.	172.
6 30	132.	761.	207.
6 40	140.	794.	243.

6	50	147.	826.	278.
6	60	155.	853.	312.
7	10	163.	886.	347.
7	20	173.	944.	383.
7	30	180.	1044.	423.
7	40	191.	1278.	474.
7	50	206.	1627.	560.
7	60	225.	1965.	687.
8	10	245.	2236.	828.
8	20	264.	2270.	974.
8	30	278.	2074.	1127.
8	40	287.	1804.	1222.
8	50	291.	1517.	1263.
8	60	290.	1252.	1261.
9	10	287.	1018.	1227.
9	20	283.	869.	1177.
9	30	278.	804.	1125.
9	40	273.	758.	1074.
9	50	269.	723.	1025.
9	60	264.	694.	979.
10	10	260.	658.	934.
10	20	256.	602.	903.
10	30	251.	526.	869.
10	40	245.	430.	829.
10	50	239.	333.	784.
10	60	232.	253.	736.
11	10	225.	191.	686.
11	20	218.	146.	638.
11	30	211.	120.	591.
11	40	204.	111.	547.
11	50	199.	111.	509.
11	60	193.	111.	485.
12	10	188.	108.	462.
12	20	184.	100.	440.
12	30	179.	86.	419.
12	40	174.	67.	398.
12	50	169.	46.	377.
12	60	165.	30.	356.
13	10	160.	17.	335.
13	20	156.	7.	315.
13	30	152.	2.	297.
13	40	148.	0.	279.
13	50	144.	0.	262.
13	60	140.	0.	246.
14	10	137.	0.	231.
14	20	134.	0.	217.
14	30	131.	0.	204.
14	40	128.	0.	192.
14	50	126.	0.	181.
14	60	123.	0.	170.
	SUM			31939.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1263.	753.	355.	355.	31939.
INCHES		6.74	7.94	7.94	7.94
AC-FT		374.	440.	440.	440.

OVF

STATION 1



NAD

RUNOFF SUMMARY, AVERAGE FLOW

	PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	2346.	981.	449.	449.	1.04
ROUTED TO	1263.	753.	355.	355.	1.04

****
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****

FLOOD ROUTING THROUGH GLEN WILD LAKE
WITH FLASHBOARDS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
90	0	10	1	-0	-0	-0	2	-0	-0

JOPER	NWT
3	-0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	-0	-0	-0	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.04	-0.00	1.04	1.00	.300	-0	-0	-0

PRECIP DATA

NP	STORM	DAJ	DAK
72	-0.00	-0.00	-0.00

PRECIP PATTERN

.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
.06	.06	.19	.19	.19	.19	.19	.19	.19	.19
.19	.19	.19	.19	.38	.38	.38	.38	.38	.38
.47	.47	.47	.47	.47	.47	.58	.58	.58	.58
.58	.58	.88	1.05	1.31	3.33	1.23	.96	.54	.54
.54	.54	.54	.54	.42	.42	.42	.42	.42	.42
.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
.09	.09								

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	1.00	.15	-0.00	.16

GIVEN UNIT GRAPH, NUMGQ= 9

201.	403.	604.	805.	671.	537.	403.	268.	134.

UNIT GRAPH TOTALS 4026. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

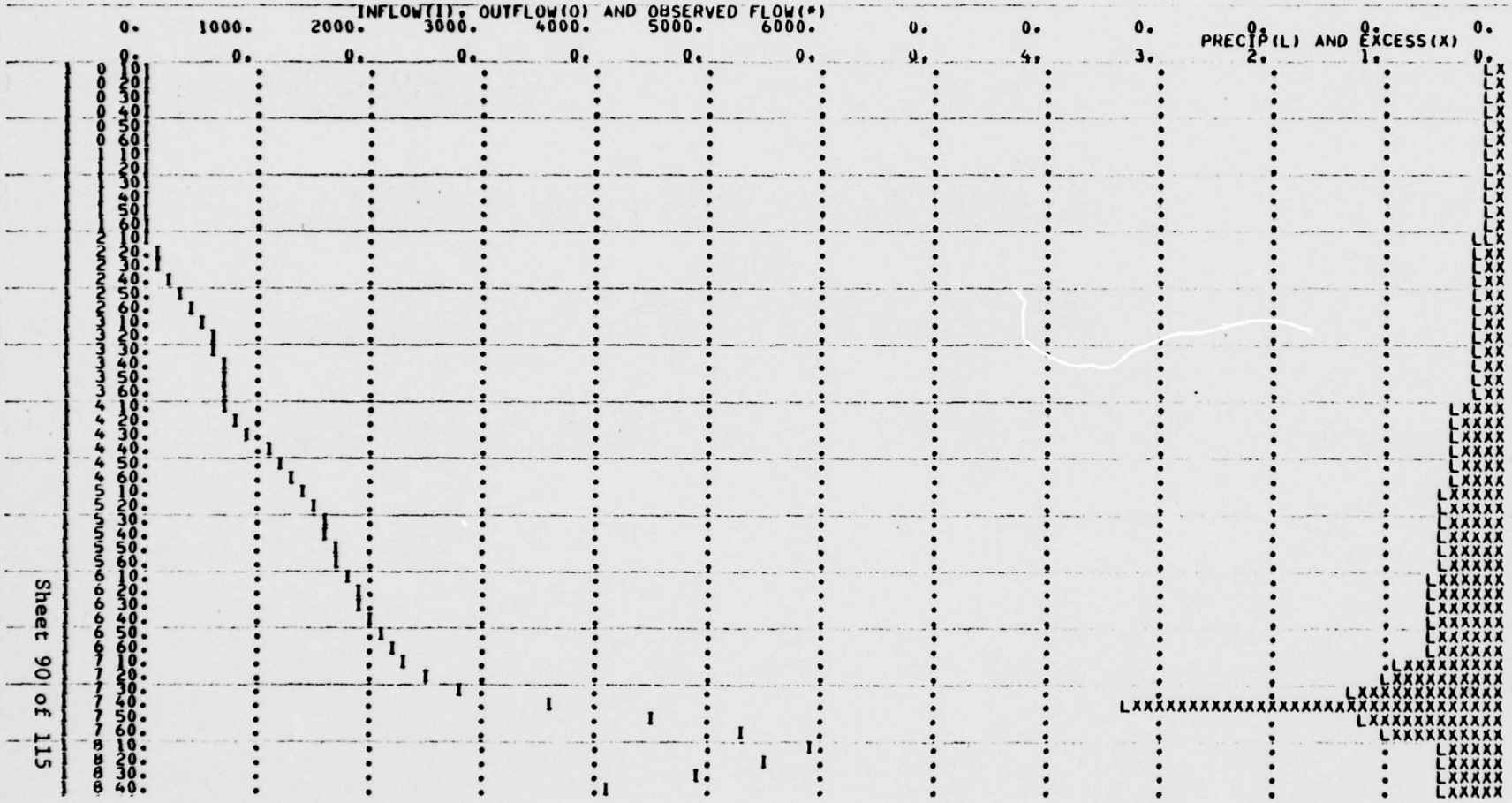
TIME	RAIN	EXCS	COMP Q
1 -0 -0	.06	.01	2.
1 -0 -0	.06	.01	6.
1 -0 -0	.06	.01	12.
1 -0 -0	.06	.01	19.
1 -0 -0	.06	.01	26.
1 -0 -0	.06	.01	31.

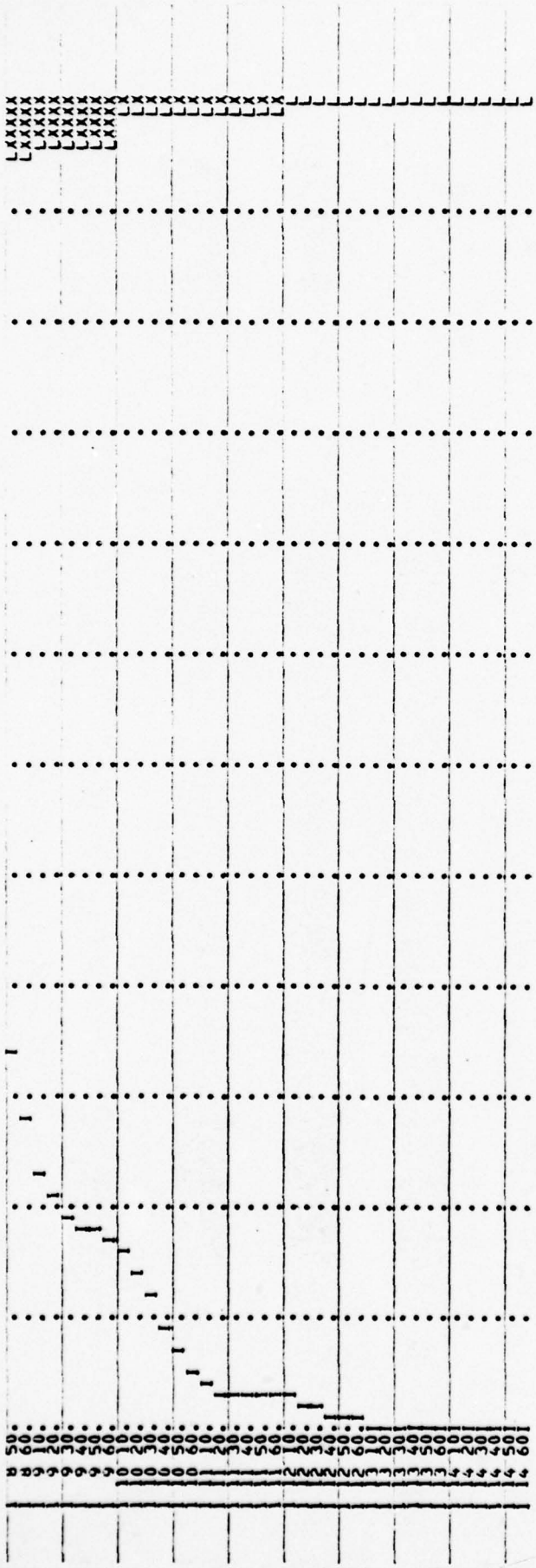
-0 -0	0.00	0.00	194.	
-0 -0	0.00	0.00	139.	
-0 -0	0.00	0.00	93.	
-0 -0	0.00	0.00	56.	
-0 -0	0.00	0.00	28.	
-0 -0	0.00	0.00	9.	
-0 -0	0.00	0.00	0.	
-0 -0	0.00	0.00	0.	
-0 -0	0.00	0.00	0.	
-0 -0	0.00	0.00	0.	
-0 -0	0.00	0.00	0.	
-0 -0	0.00	0.00	0.	
-0 -0	0.00	0.00	0.	
-0 -0	0.00	0.00	0.	
-0 -0	0.00	0.00	0.	
-0 -0	0.00	0.00	0.	
SUM	27.18	25.17	101099.	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5865.	2453.	1123.	1123.	101097.
INCHES		21.94	25.12	25.12	25.12
AC-FT		1217.	1393.	1393.	1393.

OVF

STATION 1



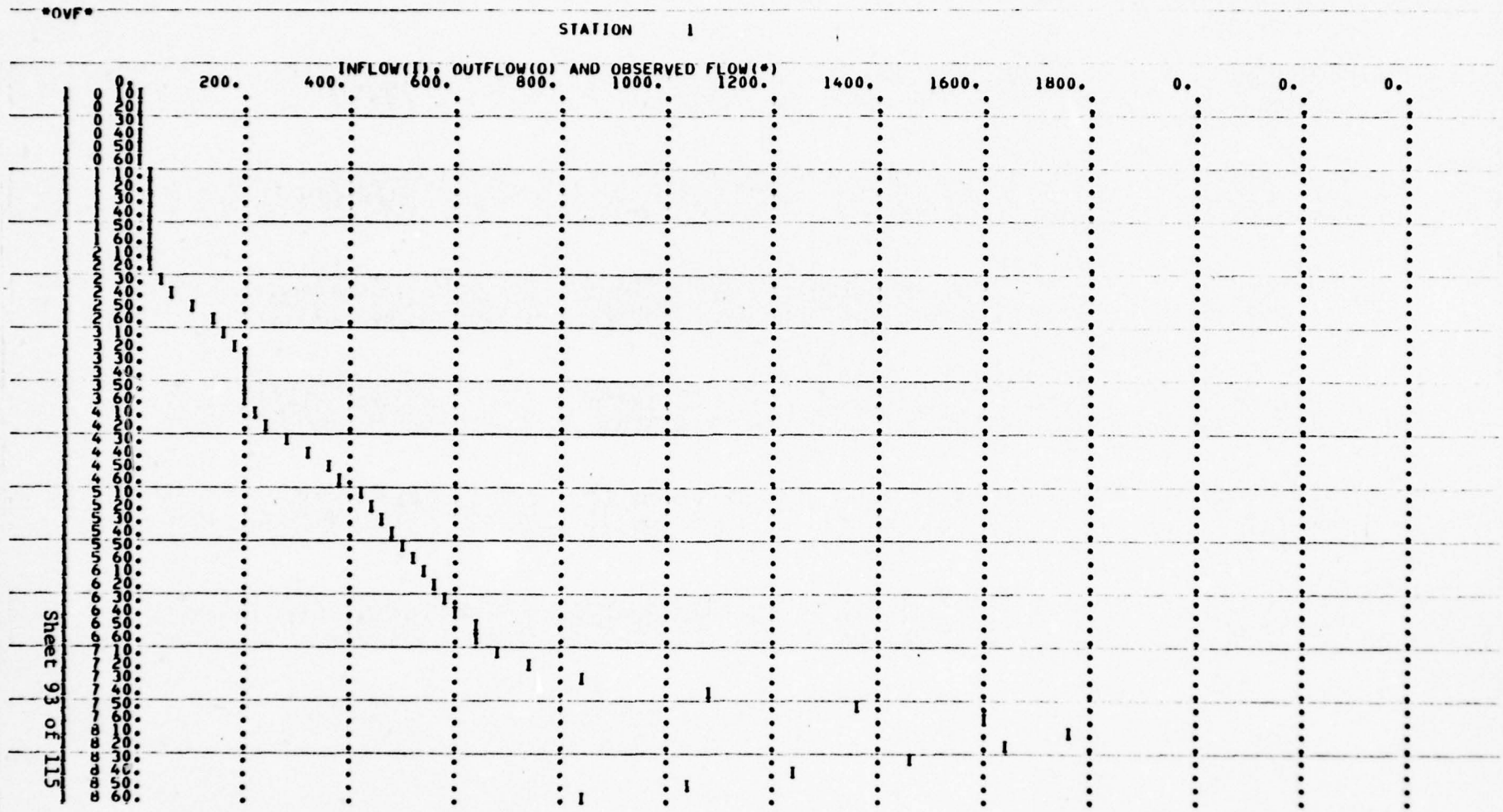


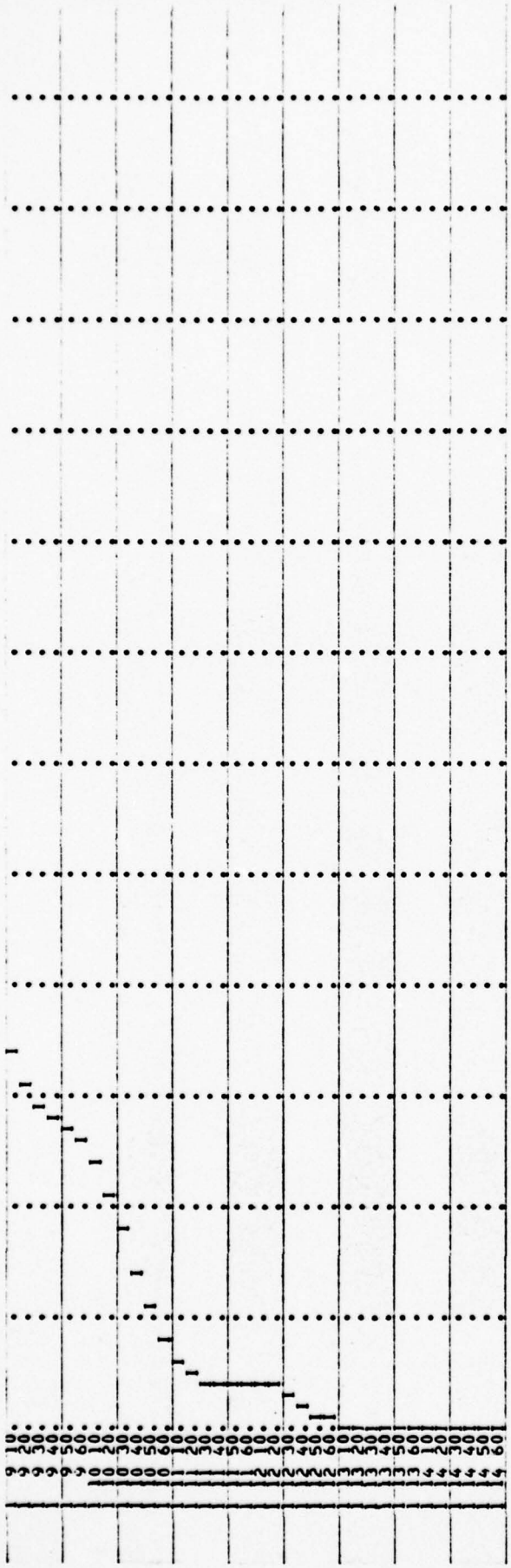
OVN

RUNOFF MULTIPLIED BY .30

1.	2.	3.	6.	8.	9.	10.	11.	12.	12.
12.	12.	13.	20.	36.	62.	96.	130.	158.	179.
193.	201.	204.	204.	216.	239.	273.	319.	357.	388.
416.	442.	466.	488.	506.	521.	538.	559.	582.	609.
631.	649.	680.	735.	830.	1087.	1353.	1594.	1760.	1646.
1464.	1242.	1033.	845.	681.	622.	583.	554.	530.	511.
476.	427.	362.	283.	216.	163.	123.	97.	83.	83.
83.	83.	79.	71.	58.	42.	28.	17.	8.	3.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1760.	736.	337.	337.	30329.
INCHES		6.58	7.54	7.54	7.54
AC-FT		365.	418.	418.	418.


OVF
STATION 1
INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
0. 200. 400. 600. 800. 1000. 1200. 1400. 1600. 1800. 0. 0. 0.



OVN

HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	-0	-0	-0	-0	-0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
-0	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	0.	27.	79.	108.	199.	260.	350.	440.	630.	-0.
OUTFLOW=	0.	4.	44.	100.	510.	930.	1910.	3500.	7800.	-0.

TIME	EOP STOR	AVG IN	EOP OUT
0 10	4.	1.	1.
0 20	4.	3.	1.
0 30	4.	5.	1.
0 40	4.	7.	1.
0 50	4.	9.	1.
0 60	4.	10.	1.
1 10	4.	11.	1.
1 20	4.	11.	1.
1 30	5.	12.	1.
1 40	5.	12.	1.
1 50	5.	12.	1.
1 60	5.	12.	1.
2 10	5.	12.	1.
2 20	5.	16.	1.
2 30	6.	28.	1.
2 40	6.	49.	1.
2 50	8.	79.	1.
2 60	9.	113.	1.
3 10	11.	144.	2.
3 20	13.	168.	5.
3 30	16.	186.	2.
3 40	19.	197.	3.
3 50	21.	203.	3.
3 60	24.	204.	4.
4 10	27.	210.	4.
4 20	30.	227.	6.
4 30	33.	256.	9.
4 40	37.	296.	12.
4 50	42.	338.	15.
4 60	47.	372.	19.
5 10	52.	402.	23.
5 20	57.	429.	27.
5 30	63.	454.	32.
5 40	69.	477.	37.
5 50	76.	497.	41.
5 60	82.	513.	50.
6 10	89.	529.	63.
6 20	95.	548.	75.
6 30	102.	570.	88.
6 40	109.	595.	104.

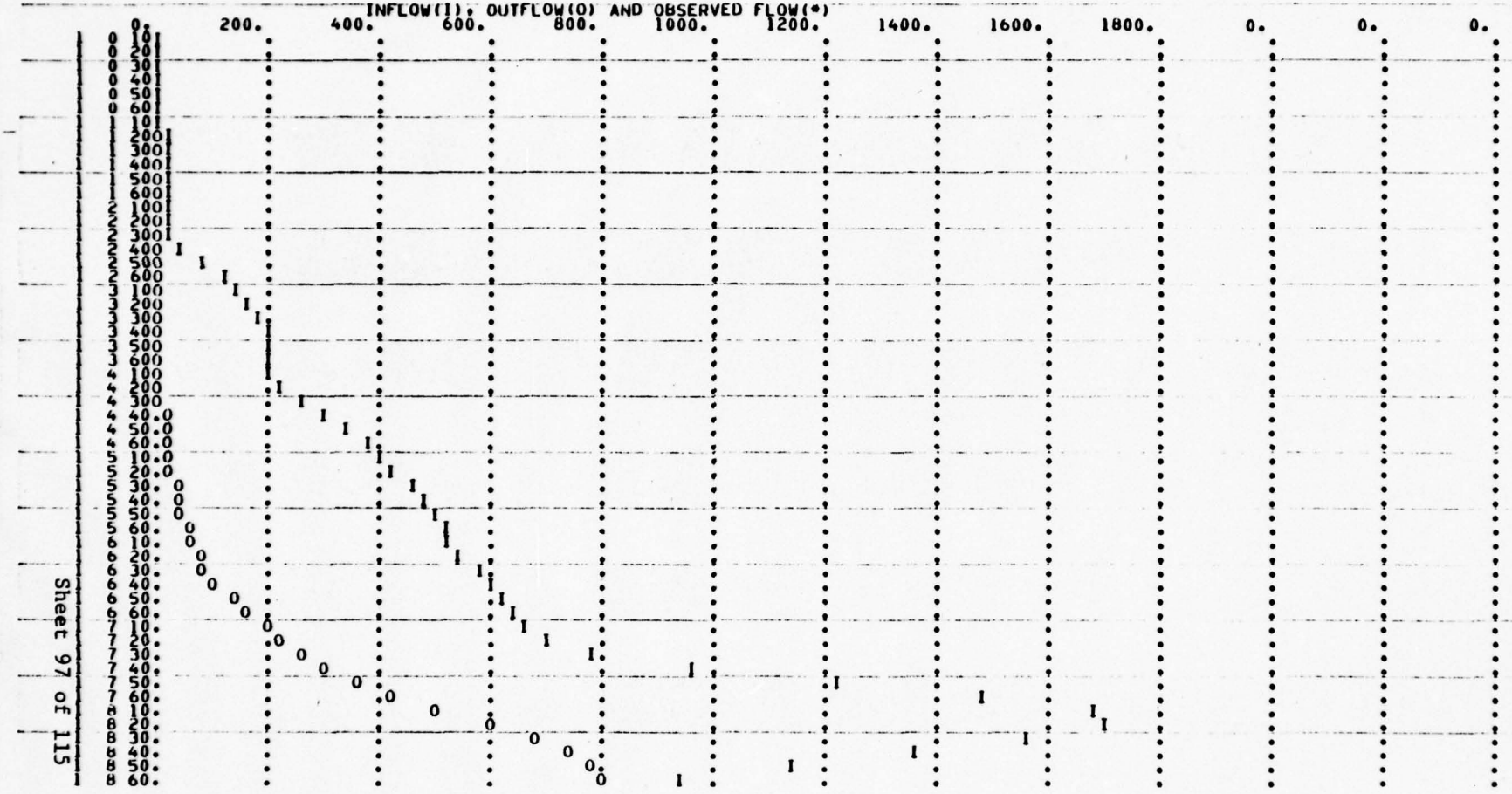
6 50	116.	620.	135.	
6 60	123.	640.	165.	
7 10	129.	664.	195.	
7 20	136.	708.	226.	
7 30	143.	783.	260.	
7 40	153.	959.	302.	
7 50	165.	1220.	357.	
7 60	180.	1474.	424.	
8 10	197.	1677.	500.	
8 20	213.	1703.	603.	
8 30	225.	1555.	690.	
8 40	234.	1353.	750.	
8 50	239.	1138.	785.	
8 60	241.	939.	799.	
9 10	240.	763.	796.	
9 20	239.	652.	783.	
9 30	236.	603.	766.	
9 40	234.	569.	748.	
9 50	231.	542.	730.	
9 60	228.	521.	711.	
10 10	225.	494.	691.	
10 20	222.	452.	669.	
10 30	219.	395.	645.	
10 40	214.	322.	615.	
10 50	209.	249.	582.	
10 60	204.	190.	547.	
11 10	199.	143.	510.	
11 20	94.	110.	486.	
11 30	88.	90.	462.	
11 40	83.	83.	439.	
11 50	79.	83.	418.	
11 60	74.	83.	398.	
12 10	70.	81.	379.	
12 20	66.	75.	360.	
12 30	62.	65.	343.	
12 40	58.	50.	325.	
12 50	54.	35.	308.	
12 60	50.	22.	290.	
13 10	47.	12.	274.	
13 20	43.	6.	258.	
13 30	40.	1.	242.	
13 40	36.	0.	228.	
13 50	33.	0.	214.	
13 60	30.	0.	201.	
14 10	128.	0.	189.	
14 20	125.	0.	178.	
14 30	123.	0.	167.	
14 40	121.	0.	157.	
14 50	119.	0.	147.	
14 60	117.	0.	138.	
SUM			22221.	

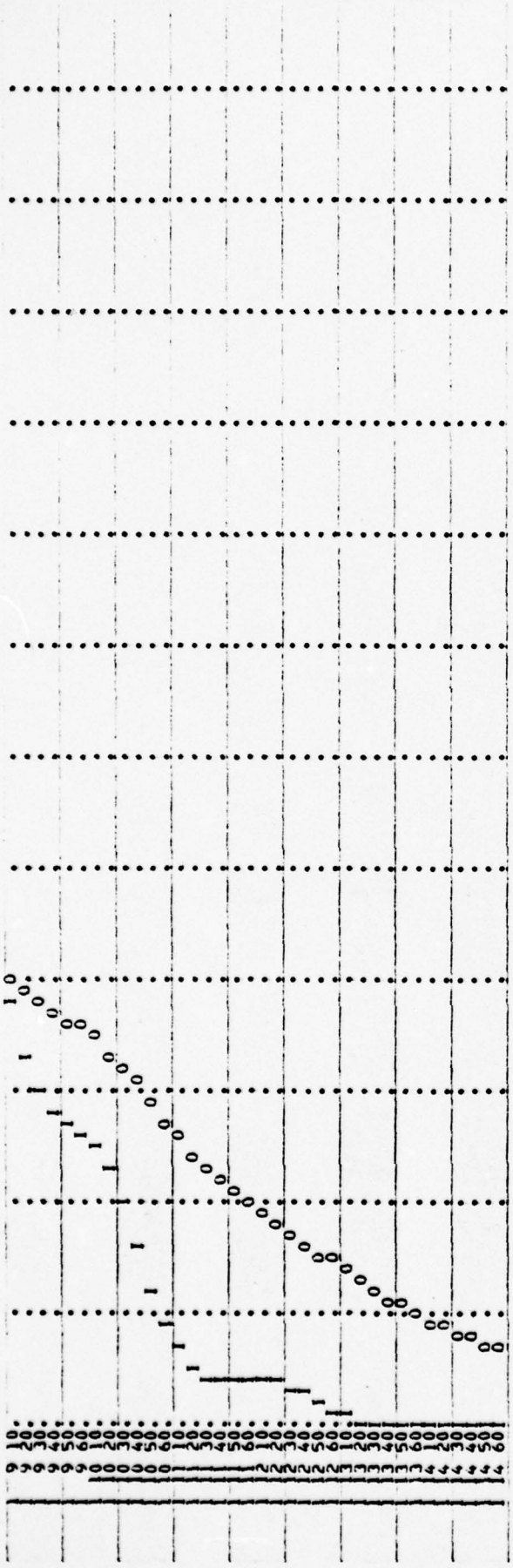
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	799.	528.	247.	247.	22221.
INCHES		4.72	5.52	5.52	5.52
AC-FT		262.	306.	306.	306.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)





GND

RUNOFF SUMMARY; AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	1760.	736.	337.	337.	1.04
ROUTED TO	1	799.	528.	247.	247.	1.04

****
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****

FLOOD ROUTING THROUGH GLEN WILD LAKE
WITH FLASHBOARDS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
90	0	10	1	-0	-0	-0	2	-0	-0

JOPER: 3 NWT: -0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	-0	-0	-0	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.04	-0.00	1.04	1.00	.200	-0	-0	-0

PRECIP DATA

NP	STORM	DAJ	DAK
72	-0.00	-0.00	-0.00

PRECIP PATTERN

.06	.06	.06	.06	.06	.06	.06	.06	.06
.06	.06	.19	.19	.19	.19	.19	.19	.19
.19	.19	.19	.19	.38	.38	.38	.38	.38
.47	.47	.47	.47	.47	.47	.58	.58	.58
.58	.58	.88	1.05	1.31	3.33	1.23	.96	.54
.54	.54	.54	.54	.42	.42	.42	.42	.42
.09	.09	.09	.09	.09	.09	.09	.09	.09
.09	.09							

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	1.00	.15	-0.00	.16

GIVEN UNIT GRAPH, NUHGQ= 9

201. 403. 604. 805. 671. 537. 403. 268. 134.

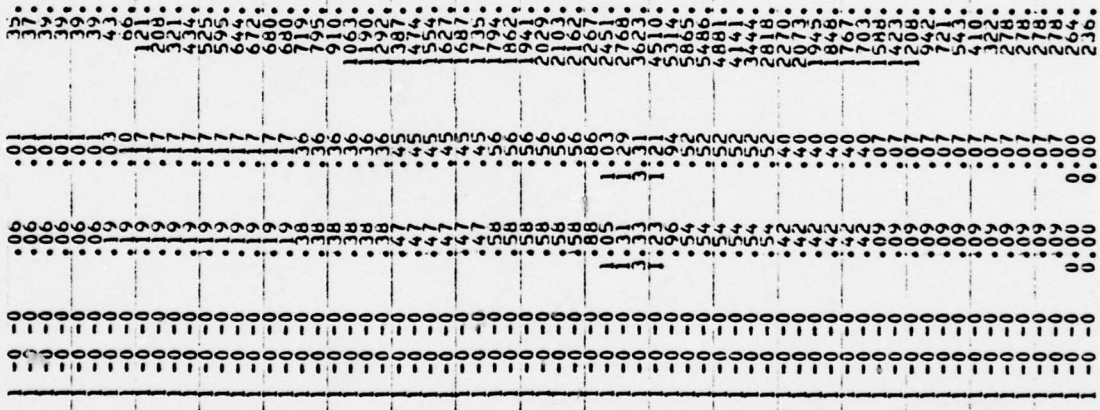
UNIT GRAPH TOTALS 4026. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

	TIME	RAIN	EXCS	COMP Q
1	-0 -0	.06	.01	2.
1	-0 -0	.06	.01	6.
1	-0 -0	.06	.01	12.
1	-0 -0	.06	.01	19.
1	-0 -0	.06	.01	26.
1	-0 -0	.06	.01	31.

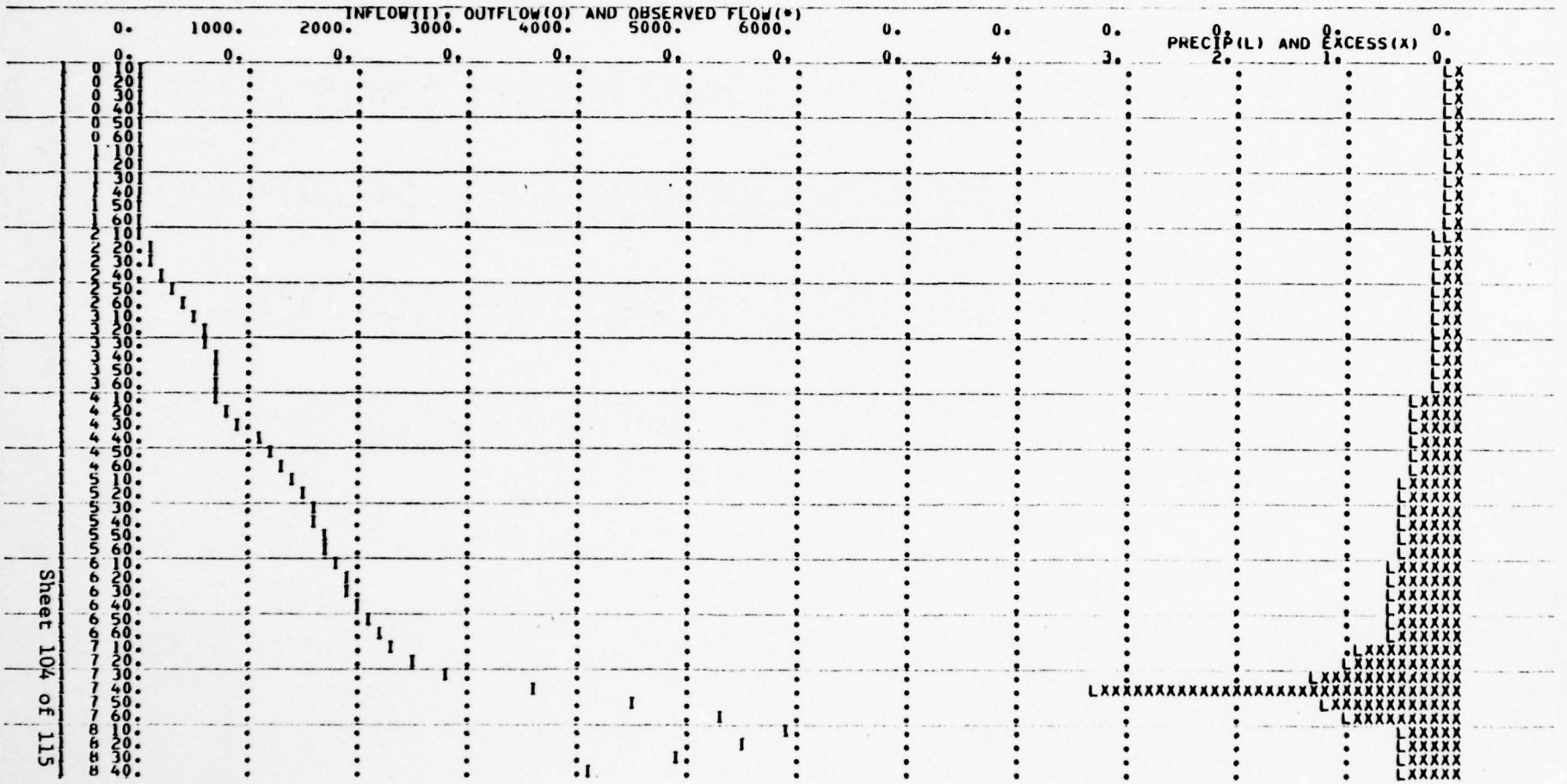


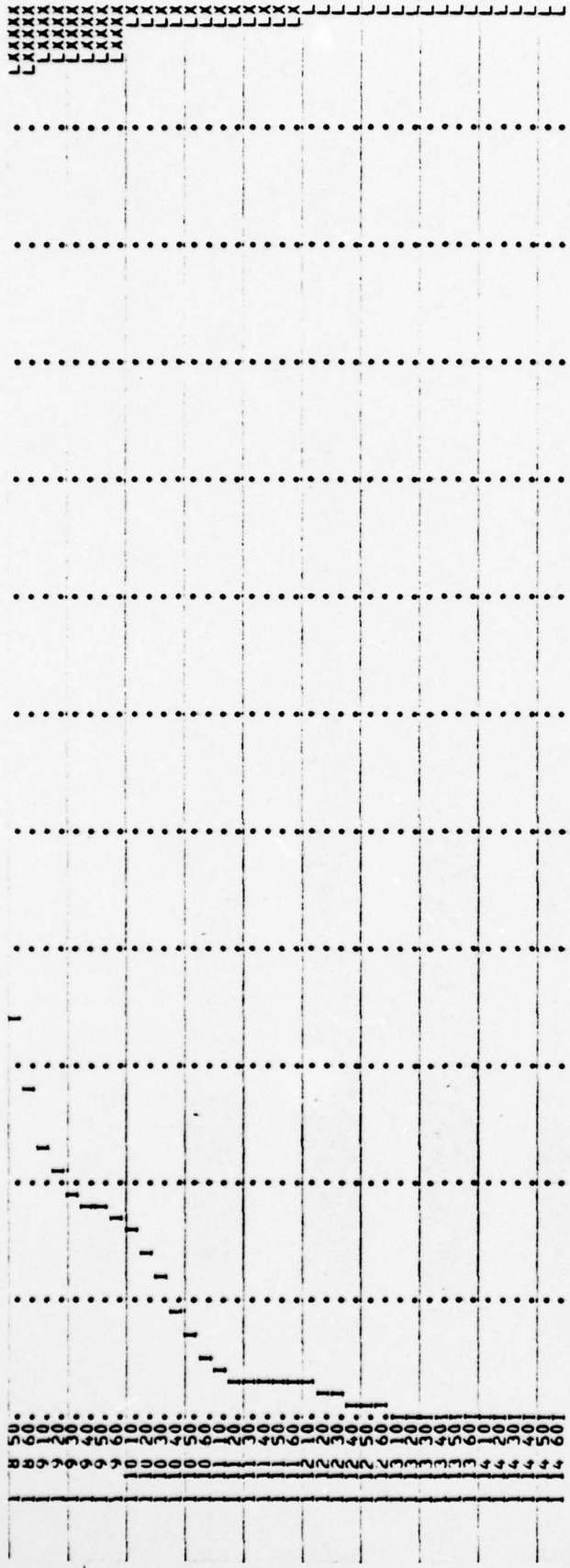
	-0	-0	0.00	0.00	194.
	-0	-0	0.00	0.00	139.
	-0	-0	0.00	0.00	93.
	-0	-0	0.00	0.00	56.
	-0	-0	0.00	0.00	28.
	-0	-0	0.00	0.00	9.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
		SUM	27.18	25.17	101099.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5865.	2453.	1123.	1123.	101097.
INCHES		21.94	25.12	25.12	25.12
AC-FT		1217.	1393.	1393.	1393.

OVF

STATION 1





OVN

RUNOFF MULTIPLIED BY .20

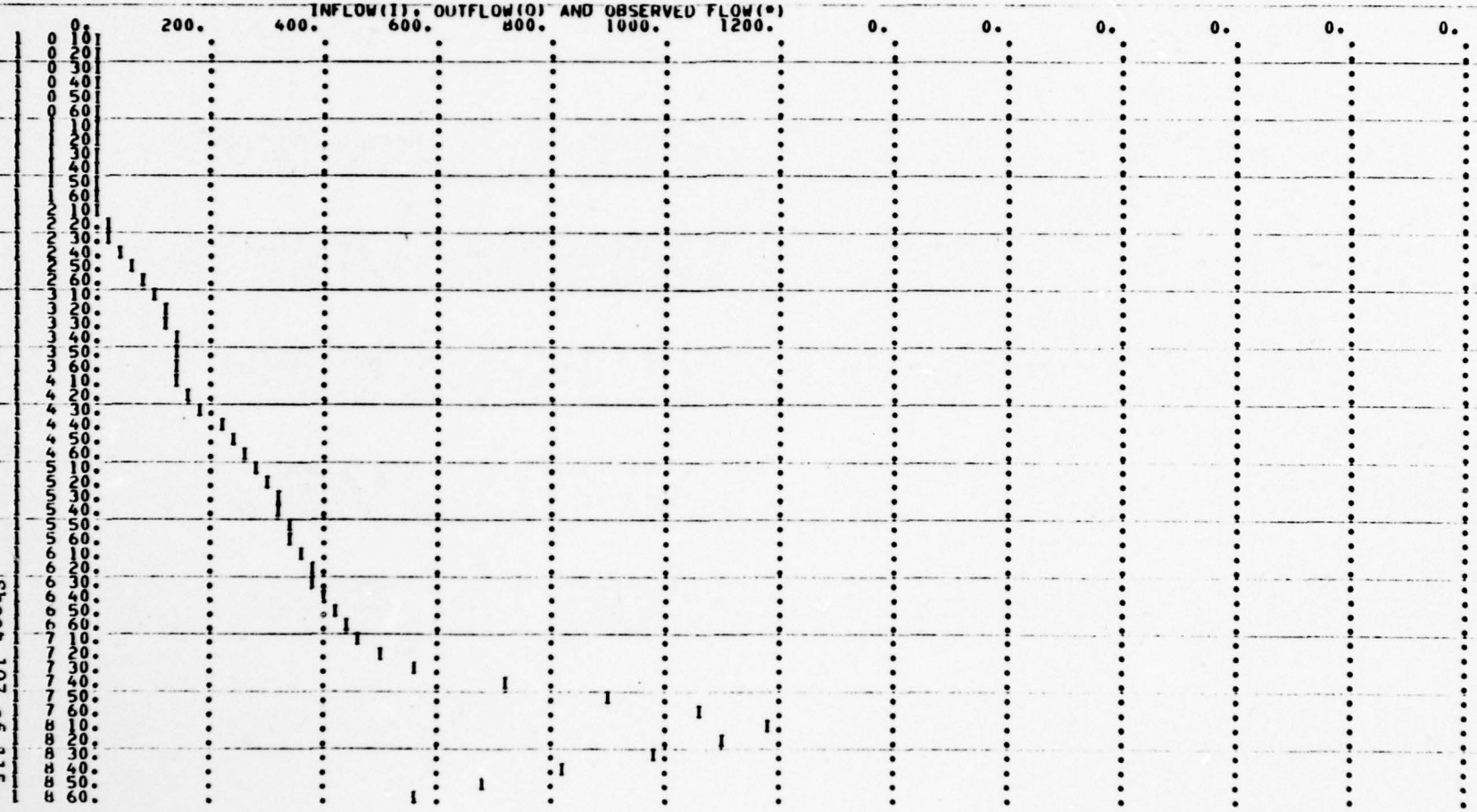
0.	1.	2.	4.	5.	6.	7.	7.	8.	8.
8.	8.	9.	13.	24.	42.	64.	87.	105.	119.
129.	134.	136.	136.	144.	159.	182.	213.	238.	258.
277.	295.	311.	325.	337.	347.	359.	372.	388.	406.
421.	432.	453.	490.	554.	725.	902.	1063.	1173.	1097.
976.	828.	689.	564.	454.	415.	389.	370.	353.	341.
318.	285.	242.	188.	144.	109.	82.	64.	56.	56.
56.	56.	53.	47.	39.	28.	19.	11.	6.	2.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

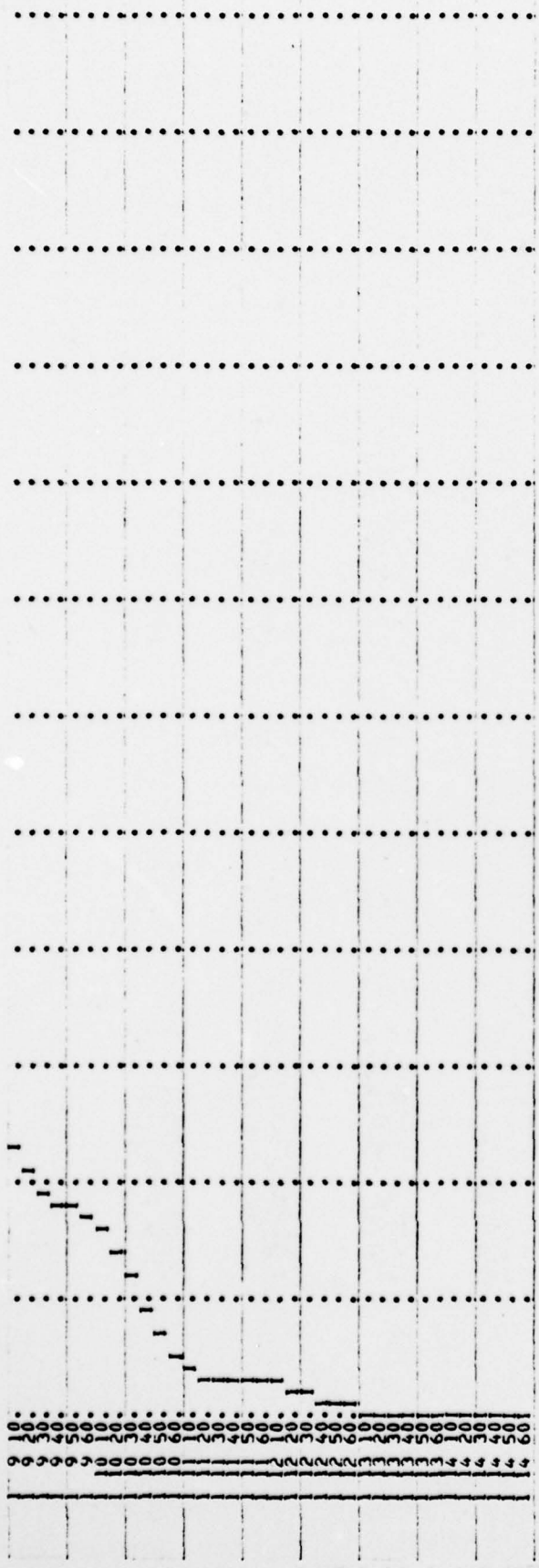
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1173.	491.	225.	225.	20219.
INCHES		4.39	5.02	5.02	5.02
AC-FT		243.	279.	279.	279.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)





OVN

HYDROGRAPH ROUTING

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	-0	-0	-0	-0	-0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
-0	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	0.	27.	79.	108.	199.	260.	350.	440.	630.	-0.
OUTFLOW=	0.	4.	44.	100.	510.	930.	1910.	3500.	7800.	-0.

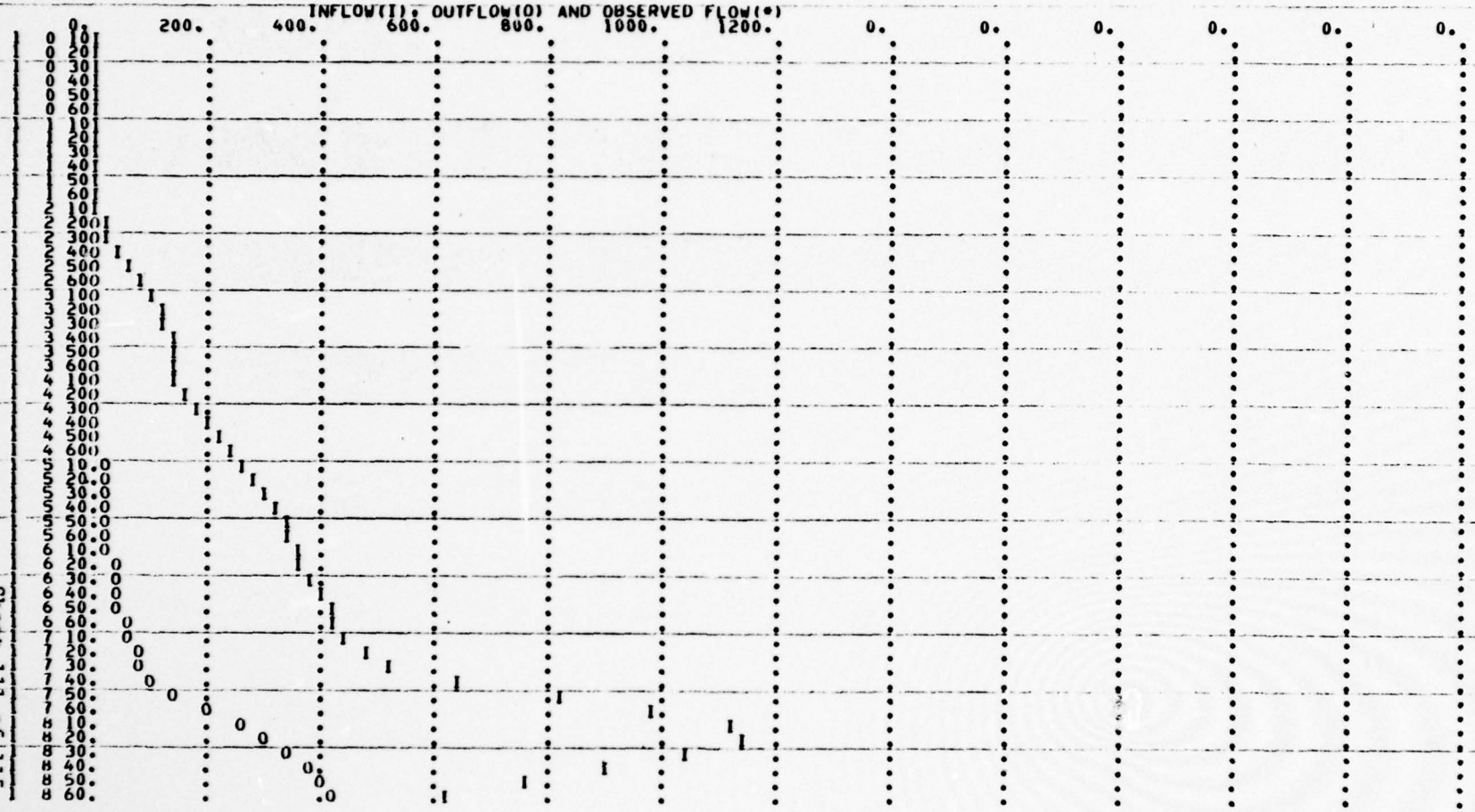
TIME	EOP STOR	AVG IN	EOP OUT
0 10	3.	0.	0.
0 20	3.	1.	0.
0 30	3.	2.	0.
0 40	3.	3.	0.
0 50	3.	5.	0.
0 60	3.	6.	0.
1 10	3.	7.	0.
1 20	3.	7.	0.
1 30	3.	8.	0.
1 40	3.	8.	0.
1 50	3.	8.	0.
1 60	3.	8.	0.
2 10	3.	8.	1.
2 20	4.	11.	1.
2 30	4.	19.	1.
2 40	4.	33.	1.
2 50	5.	53.	1.
2 60	6.	75.	1.
3 10	7.	96.	1.
3 20	9.	112.	2.
3 30	11.	124.	2.
3 40	12.	132.	2.
3 50	14.	135.	2.
3 60	16.	136.	2.
4 10	18.	140.	3.
4 20	20.	151.	3.
4 30	22.	171.	3.
4 40	25.	197.	4.
4 50	28.	225.	5.
4 60	31.	248.	7.
5 10	35.	268.	10.
5 20	39.	286.	13.
5 30	43.	303.	16.
5 40	47.	318.	19.
5 50	51.	331.	23.
5 60	55.	342.	26.
6 10	60.	353.	29.
6 20	65.	366.	33.
6 30	69.	380.	37.
6 40	74.	397.	40.

6 50	79.	413.	45.	
6 60	85.	426.	55.	
7 10	90.	443.	65.	
7 20	95.	472.	76.	
7 30	101.	522.	87.	
7 40	109.	639.	104.	
7 50	118.	813.	147.	
7 60	130.	982.	197.	
8 10	142.	1118.	252.	
8 20	154.	1135.	306.	
8 30	163.	1037.	350.	
8 40	171.	902.	383.	
8 50	176.	758.	405.	
8 60	179.	626.	419.	
9 10	180.	509.	424.	
9 20	180.	434.	425.	
9 30	180.	402.	423.	
9 40	179.	379.	421.	
9 50	178.	362.	417.	
9 60	177.	347.	413.	
10 10	176.	329.	408.	
10 20	175.	301.	401.	
10 30	173.	263.	393.	
10 40	171.	215.	382.	
10 50	168.	166.	369.	
10 60	165.	126.	355.	
11 10	161.	95.	339.	
11 20	158.	73.	323.	
11 30	154.	60.	307.	
11 40	151.	56.	292.	
11 50	147.	56.	278.	
11 60	145.	56.	265.	
12 10	142.	54.	252.	
12 20	139.	50.	240.	
12 30	136.	43.	228.	
12 40	134.	33.	216.	
12 50	131.	23.	205.	
12 60	129.	15.	193.	
13 10	126.	8.	182.	
13 20	124.	4.	171.	
13 30	122.	1.	161.	
13 40	119.	0.	151.	
13 50	117.	0.	142.	
13 60	115.	0.	134.	
14 10	114.	0.	126.	
14 20	112.	0.	118.	
14 30	110.	0.	111.	
14 40	109.	0.	104.	
14 50	108.	0.	99.	
14 60	106.	0.	97.	
SUM			12746.	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	425.	308.	142.	142.	12746.
INCHES		2.76	3.17	3.17	3.17
AC-FT		153.	176.	176.	176.

OVF

STATION 1



•OVN•

RUNOFF SUMMARY, AVERAGE FLOW

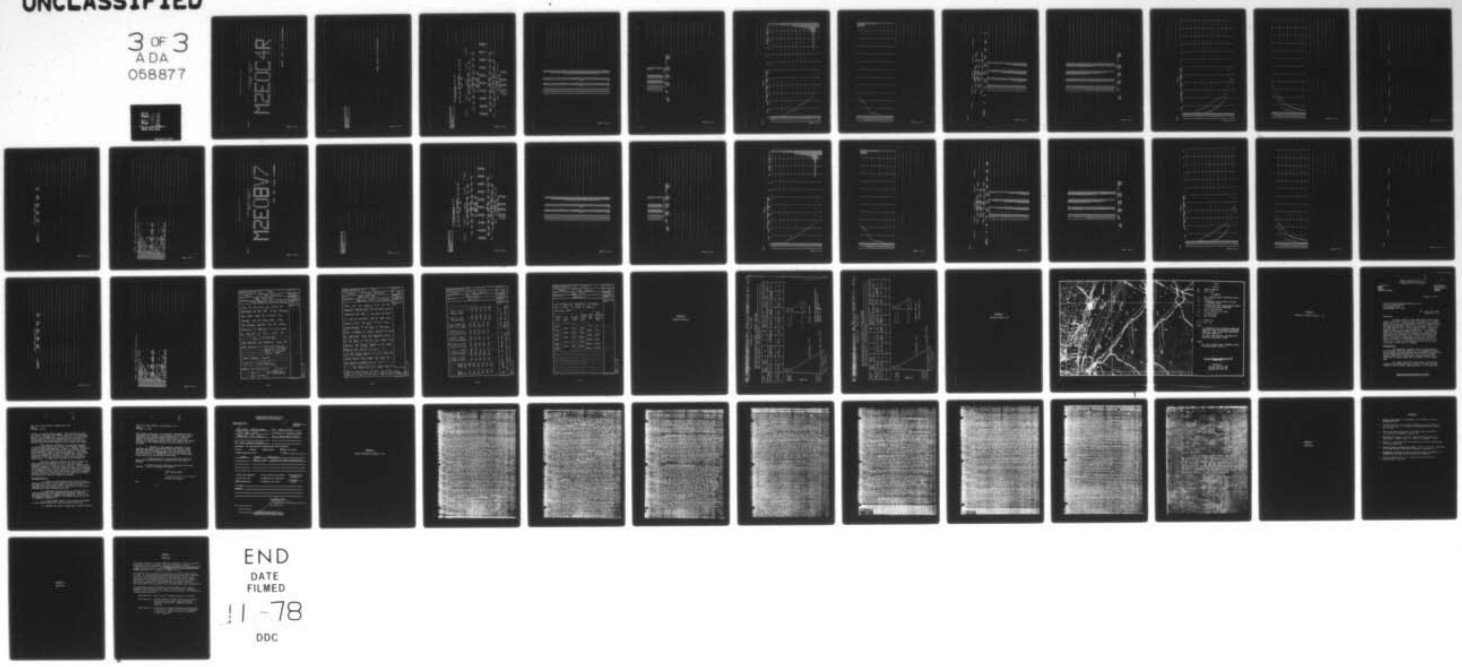
		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	1173.	491.	225.	225.	1.04
ROUTED TO	1	425.	308.	142.	142.	1.04

```
      FOM1AWN.   07/19/78. *UNITED COMPUTING* 67. APEX/SL D.2.0

09.35.25$HAOUL,CM100000,T20.  HAP 6547 067249000
09.35.25.0674 4695 UCS
09.35.26$AC3400G328303,067249000 .B
09.35.26. 07/19/78.FOM1AWN
09.35.26$FL    32768      0.00|          5         3,
09.35.26$FT        0          |
09.35.26.GET,HEC1(LIBRARY)
09.35.28.READY -    HEC1
09.35.28.RFL,150000.
09.35.28$FL     4096      0.00|          0         0,
09.35.28$FT        0          |
09.35.28.HEC1.
09.35.28$FLS   53248      0.001
09.35.30$FLR   53248      0.185        349          15
09.35.30.FL REQUIRED TO LOAD    141322B ( 49874)
09.35.30.FL REQUIRED TO EXECUTE 123700B ( 42944)
09.35.30$FL    53248      0.195
09.37.13.STOP
09.37.13.GOEXIT.
09.37.13. ILLEGAL CONTROL CARD.
09.37.13.EXIT.
09.37.13$SB*  42944      7.237      2055        164
09.37.13.COST.
09.37.13$FL   42944      7.237
09.37.14.            SERV. UNITS-2 =      38
09.37.14.            JOB COST=$          9.50
09.37.14$JT03 12288      7.259         7          5
09.37.14.    *FL*  *CPU SEC. *DISC PRUS* DISC ACC
09.37.14.* LDR PRUS*P.F. ACC *TAPE PRUS* TAPE ACC
```

AD-A058 877 GILBERT ASSOCIATES INC READING PA F/G 13/2
NATIONAL DAM SAFETY PROGRAM. GLEN WILD LAKE (NJ00222). PASSAIC --ETC(U)
JUL 78 J M NORMANN DACW61-78-C-0114
UNCLASSIFIED NL

3 OF 3
ADA
058877

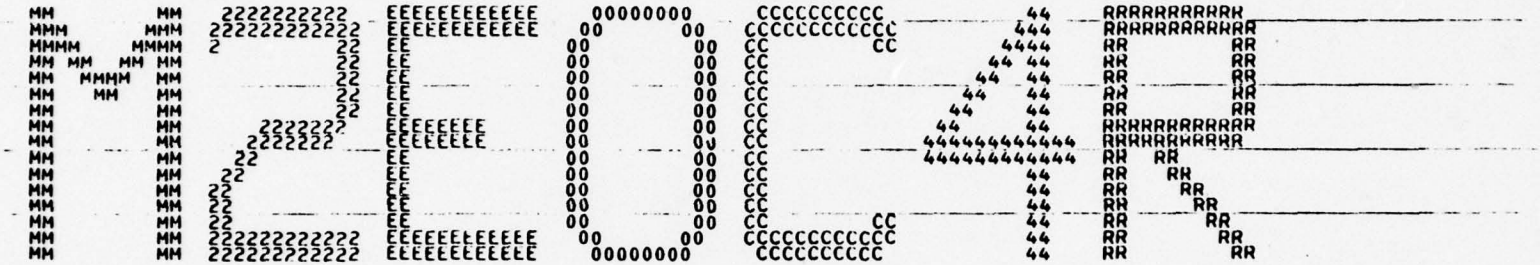


END
DATE
FILMED
11-78
DDC

6000 REMOTE BATCH

M2E0C4R *UNITED COMPUTING* 67. APEX/SL D.2.0

10.28.42. 08/01/78.



GLEN WILD, WITH FLASHBOARDS

HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01

GLEN WILD., WITH FLASHBOARDS

****
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****

FLOOD ROUTING THROUGH GLEN WILD LAKE
WITH FLASHBOARDS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
90	0	10	1	-0	-0	-0	2	-0	-0

JOPER	NWT
3	-0

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	-0	-0	-0	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.04	-0.00	1.04	1.00	-0.000	-0	-0	-0

PRECIP DATA

NP	STORM	DAJ	DAK
72	-0.00	-0.00	-0.00

PRECIP PATTERN

.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
.06	.06	.19	.19	.19	.19	.19	.19	.19	.19
.19	.19	.19	.19	.38	.38	.38	.38	.38	.38
.47	.47	.47	.47	.47	.47	.58	.58	.58	.58
.58	.58	.88	1.05	1.31	3.33	1.23	.96	.54	.54
.54	.54	.54	.54	.42	.42	.42	.42	.42	.42
.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
.09	.09								

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRIL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	1.00	.15	-0.00	.16

GIVEN UNIT GRAPH, NUMGQ= 9

201.	403.	604.	805.	671.	537.	403.	268.	134.

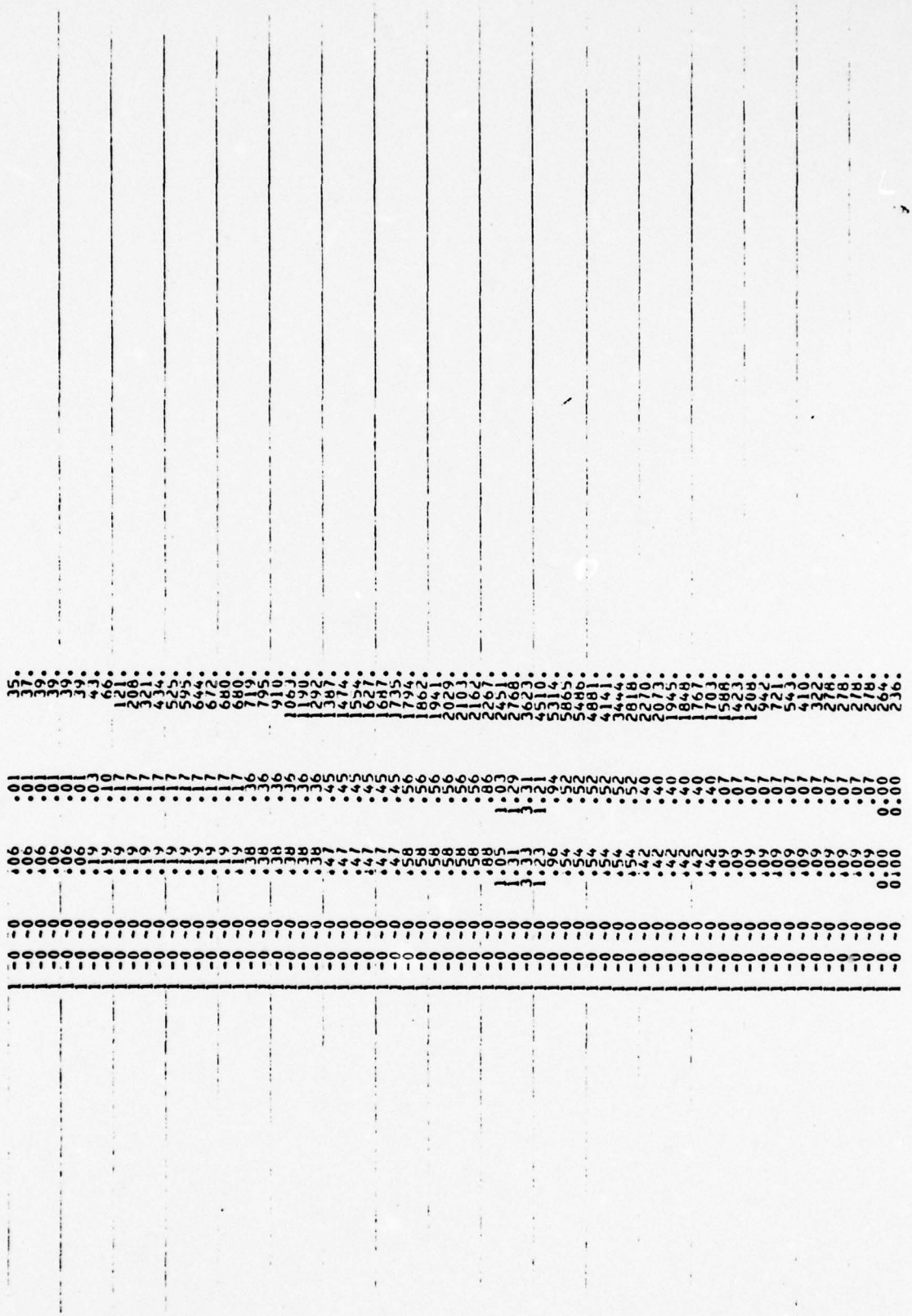
UNIT GRAPH TOTALS 4026. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
-0 -0	.06	.01	2.
-0 -0	.06	.01	6.
-0 -0	.06	.01	12.
-0 -0	.06	.01	19.
-0 -0	.06	.01	26.
-0 -0	.06	.01	31.

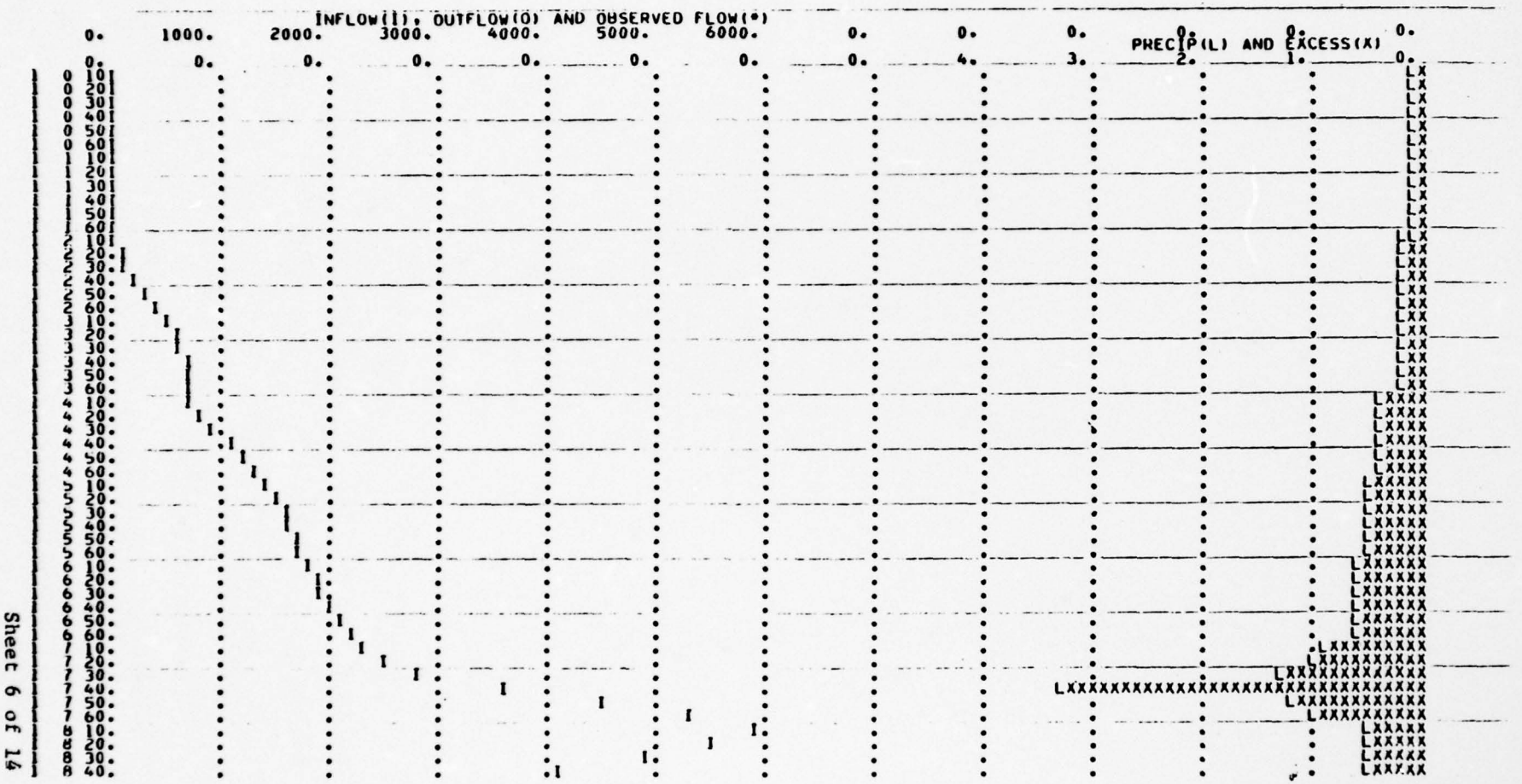


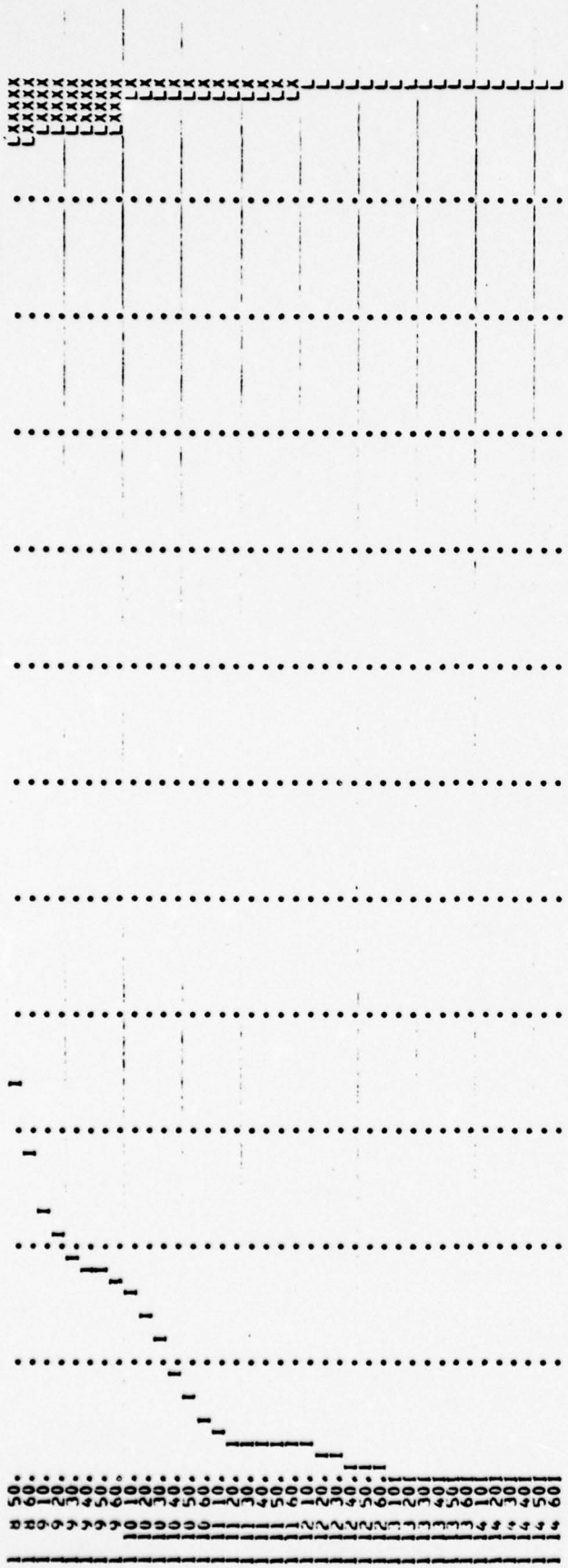
-0	-0	0.00	0.00	194.
-0	-0	0.00	0.00	139.
-0	-0	0.00	0.00	93.
-0	-0	0.00	0.00	56.
-0	-0	0.00	0.00	28.
-0	-0	0.00	0.00	9.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
-0	-0	0.00	0.00	0.
SUM		27.18	25.17	101099.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5865.	2453.	1123.	1123.	101097.
INCHES		21.94	25.12	25.12	25.12
AC-FT		1217.	1393.	1393.	1393.

OVF

STATION 1





OVN

HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	-0	-0	-0	-0	-0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
-0	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	0.	27.	79.	108.	199.	260.	350.	440.	630.	-0.
OUTFLOW=	0.	4.	44.	100.	510.	930.	1910.	3500.	7800.	-0.

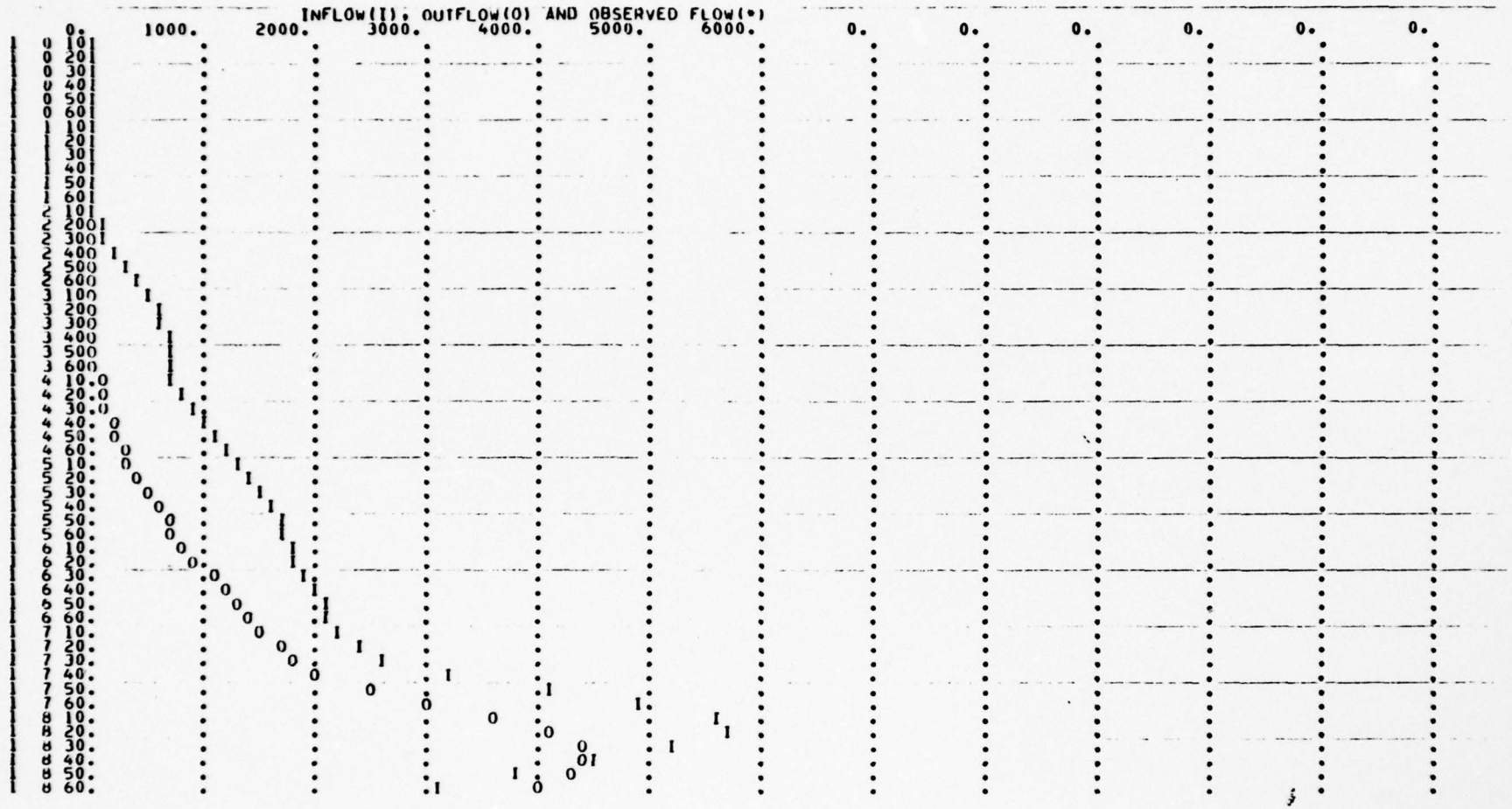
TIME	EOP STOR	AVG IN	EOP OUT
0 10	13.	2.	2.
0 20	13.	4.	2.
0 30	13.	9.	2.
0 40	13.	15.	2.
0 50	14.	23.	2.
0 60	14.	28.	2.
1 10	14.	33.	2.
1 20	15.	36.	2.
1 30	15.	38.	2.
1 40	16.	39.	2.
1 50	16.	39.	2.
1 60	17.	39.	2.
2 10	17.	41.	3.
2 20	18.	54.	3.
2 30	19.	93.	3.
2 40	22.	165.	3.
2 50	25.	264.	4.
2 60	30.	377.	7.
3 10	37.	479.	12.
3 20	44.	560.	17.
3 30	53.	620.	24.
3 40	61.	658.	30.
3 50	70.	676.	37.
3 60	79.	680.	44.
4 10	88.	699.	61.
4 20	97.	757.	79.
4 30	108.	853.	100.
4 40	120.	986.	152.
4 50	133.	1127.	211.
4 60	146.	1241.	273.
5 10	161.	1340.	337.
5 20	175.	1431.	403.
5 30	190.	1514.	470.
5 40	205.	1590.	551.
5 50	220.	1657.	651.
5 60	233.	1711.	747.
6 10	247.	1764.	839.
6 20	260.	1828.	929.
6 30	272.	1901.	1064.
6 40	284.	1985.	1192.

6 50	295.	2066.	1314.	
6 60	306.	2132.	1428.	
7 10	316.	2214.	1538.	
7 20	326.	2359.	1653.	
7 30	339.	2610.	1786.	
7 40	356.	3195.	2023.	
7 50	381.	4066.	2466.	
7 60	412.	4912.	2997.	
8 10	443.	5590.	3574.	
8 20	468.	5676.	4141.	
8 30	481.	5184.	4422.	
8 40	482.	4511.	4446.	
8 50	474.	3792.	4270.	
8 60	460.	3131.	3963.	
9 10	444.	2544.	3580.	
9 20	426.	2172.	3259.	
9 30	411.	2009.	2988.	
9 40	398.	1896.	2751.	
9 50	386.	1808.	2546.	
9 60	376.	1735.	2370.	
10 10	367.	1646.	2213.	
10 20	358.	1506.	2060.	
10 30	349.	1315.	1902.	
10 40	339.	1075.	1787.	
10 50	326.	831.	1654.	
10 60	313.	632.	1511.	
11 10	300.	477.	1367.	
11 20	287.	366.	1227.	
11 30	275.	300.	1098.	
11 40	265.	278.	983.	
11 50	256.	278.	901.	
11 60	248.	278.	844.	
12 10	240.	271.	792.	
12 20	233.	250.	743.	
12 30	226.	215.	696.	
12 40	219.	167.	648.	
12 50	212.	116.	599.	
12 60	205.	74.	552.	
13 10	198.	42.	507.	
13 20	192.	18.	478.	
13 30	186.	5.	449.	
13 40	180.	0.	422.	
13 50	174.	0.	397.	
13 60	169.	0.	373.	
14 10	164.	0.	350.	
14 20	159.	0.	329.	
14 30	155.	0.	310.	
14 40	150.	0.	291.	
14 50	146.	0.	273.	
14 60	143.	0.	257.	
SUM			91801.	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4446.	2197.	1020.	1020.	91801.
INCHES		19.65	22.81	22.81	22.81
AC-FT		1090.	1265.	1265.	1265.

OVF

STATION 1



•OVA•

RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	5865.	2453.	1123.	1123.	1.04
ROUTED TO	1	4446.	2197.	1020.	1020.	1.04

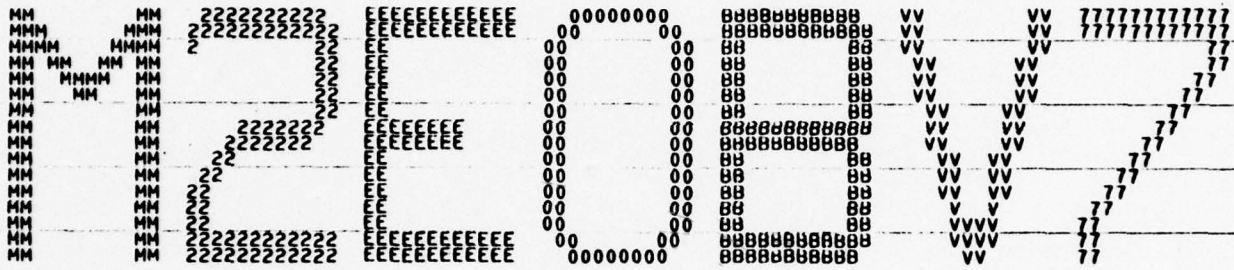
```
M2E0C4R.   08/01/78. *UNITED COMPUTING* 67. APEX/SL D.2.0

10.02.54$RAQUL,CM100000,T20.  RAP 6547 067249000
10.02.54.0674 4695 UCS
10.02.54$AC3400GJ28303.067249000 .8
10.02.54. 08/01/78.M2E0C4R
10.02.55$FL    32768      0.003          5          3.
10.02.55$FI        0          1
10.02.55.GET,MEC1(LIBRARY)
10.02.56.READY -    MEC1
10.02.56.RFL,150000.
10.02.56$FL     4096      0.004          0          0.
10.02.56$FI        0          1
10.03.02.MEC1.
10.03.02$FLS   53248      0.005
10.03.05$FLR   53248      0.184        349         20
10.03.05.FL REQUIRED TO LOAD     141328 ( 49874)
10.03.05.FL REQUIRED TO EXECUTE 1237008 ( 42944)
10.03.05$FL    53249      0.193
10.03.08.STOP
10.03.08.GOEXIT.
10.03.08. ILLEGAL CONTROL CARD.
10.03.08.EXIT.
10.03.08$SB*   42944      0.844        236         20
10.03.08.COST.
10.03.08$FL    42944      0.845
10.03.08.          SERV. UNITS-2 =       8
10.03.08.          JOB COST=$         2.00
10.03.09$JT03  12288      0.867          7          5
10.03.09.     *FL*  *CPU SEC. *DISC PRUS* DISC ACC
10.03.09.* LDR PRUS*P.F. ACC *TAPE PRUS* TAPE ACC
```

6000 REMOTE BATCH

M2E0HV7 *UNITED COMPUTING* 67. APEX/SL 0.2.0

08.52.32. 08/01/78.



GLEN WILD WITHOUT FLASHBOARDS

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**********
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
**********
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****
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****

FLOOD ROUTING THROUGH GLEN WILD LAKE
WITHOUT FLASHBOARDS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
90	0	10	1	-0	-0	-0	2	-0	-0

JOPER	NWT
3	-0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	-0	-0	-0	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.04	-0.00	1.04	1.00	-0.000	-0	-0	-0

PRECIP DATA

NP	STORM	DAJ	DAK
72	-0.00	-0.00	-0.00

PRECIP PATTERN

.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
.06	.06	.19	.19	.19	.19	.19	.19	.19	.19
.19	.19	.19	.19	.38	.38	.38	.38	.38	.38
.47	.47	.47	.47	.47	.47	.58	.58	.58	.58
.58	.58	.88	1.05	1.31	3.33	1.23	.96	.54	.54
.54	.54	.54	.54	.42	.42	.42	.42	.42	.42
.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
.09	.09								

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	1.00	.15	-0.00	.16

GIVEN UNIT GRAPH, NUHGQ= 9

201.	403.	604.	805.	671.	537.	403.	268.	134.

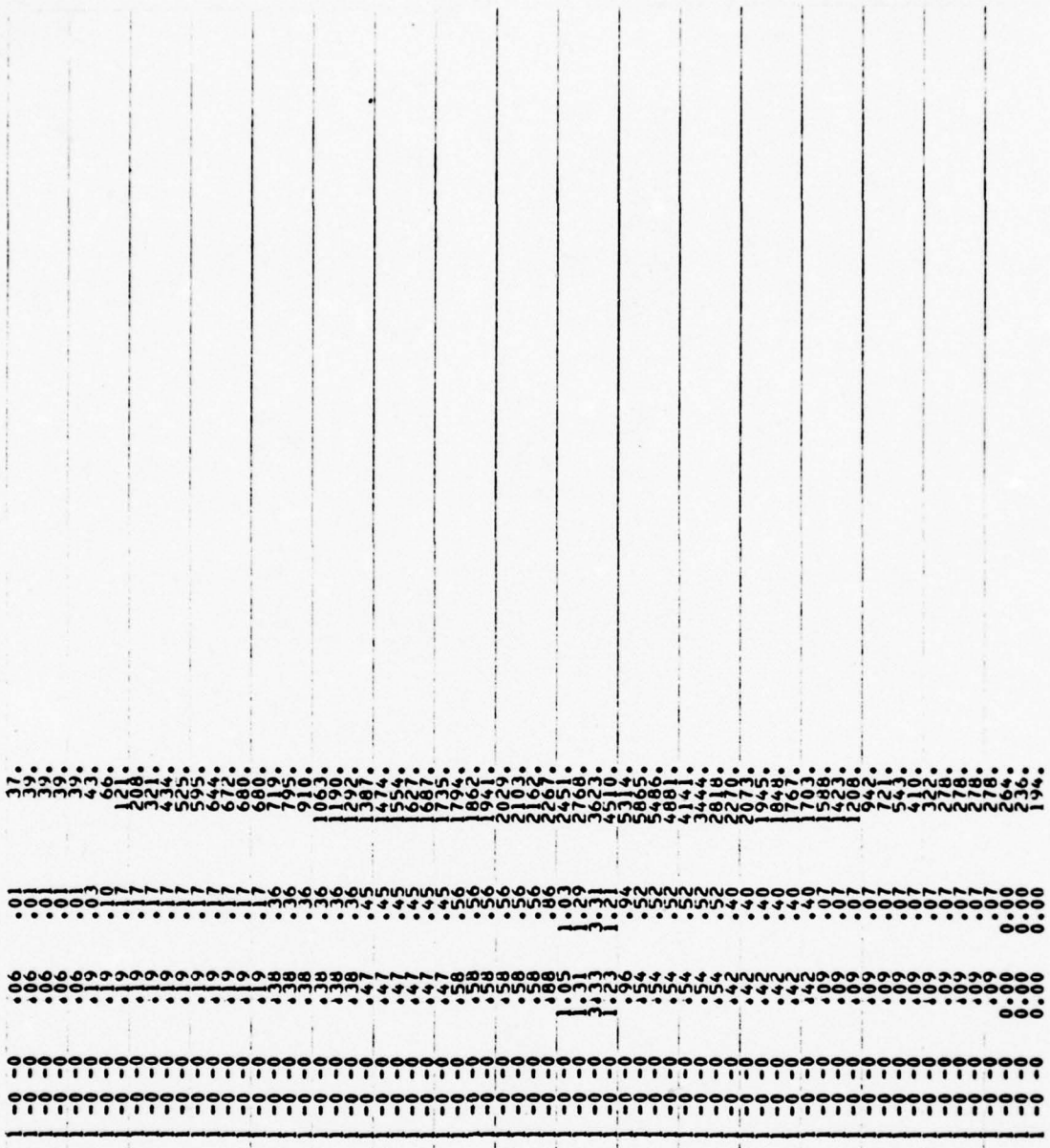
UNIT GRAPH TOTALS 4026. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

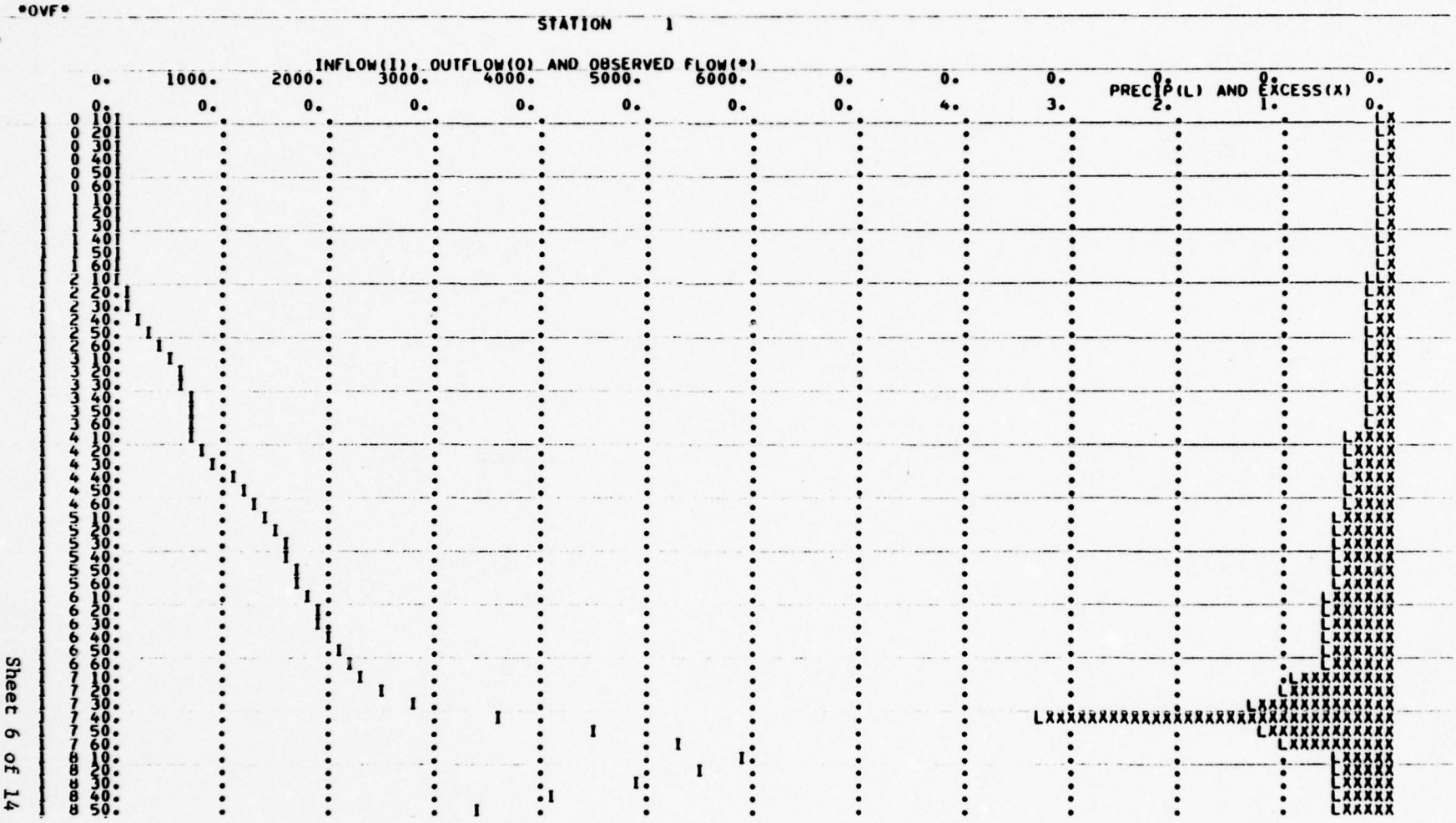
END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
-0 -0	.06	.01	2.
-0 -0	.06	.01	6.
-0 -0	.06	.01	12.
-0 -0	.06	.01	19.
-0 -0	.06	.01	26.
-0 -0	.06	.01	31.
-0 -0	.06	.01	35.



	-0	-0	0.00	0.00	139.
	-0	-0	0.00	0.00	93.
	-0	-0	0.00	0.00	56.
	-0	-0	0.00	0.00	28.
	-0	-0	0.00	0.00	9.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
	-0	-0	0.00	0.00	0.
		SUM	27.18	25.17	101099.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5865.	2453.	1123.	1123.	101097.
INCHES		21.94	25.12	25.12	25.12
AC-FT		1217.	1393.	1393.	1393.


OVF
STATION 1
INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
0. 1000. 2000. 3000. 4000. 5000. 6000.
0. 0. 0. 0. 0. 0. 0.
0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
PRECIP(L) AND EXCESS(X)
4. 3. 2. 1. 0.

OVN

HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	-0	-0	-0	-0	-0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
-0	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	0.	70.	130.	180.	210.	310.	370.	450.	550.	740.
OUTFLOW=	0.	20.	51.	110.	173.	610.	1040.	2040.	3660.	8000.

TIME	EOP STOR	AVG IN	EOP OUT
0 10	7.	2.	2.
0 20	7.	4.	2.
0 30	7.	9.	2.
0 40	7.	15.	2.
0 50	7.	23.	2.
0 60	8.	28.	2.
1 10	8.	33.	2.
1 20	9.	36.	2.
1 30	9.	38.	3.
1 40	10.	39.	3.
1 50	10.	39.	3.
1 60	11.	39.	3.
2 10	11.	41.	3.
2 20	12.	54.	3.
2 30	13.	93.	4.
2 40	15.	165.	4.
2 50	19.	264.	5.
2 60	24.	377.	7.
3 10	30.	479.	9.
3 20	38.	560.	11.
3 30	46.	620.	13.
3 40	55.	658.	16.
3 50	64.	676.	18.
3 60	73.	680.	22.
4 10	83.	699.	27.
4 20	93.	757.	32.
4 30	104.	853.	38.
4 40	117.	986.	44.
4 50	132.	1127.	53.
4 60	148.	1241.	72.
5 10	165.	1340.	93.
5 20	184.	1431.	118.
5 30	203.	1514.	158.
5 40	222.	1590.	225.
5 50	241.	1657.	309.
5 60	260.	1711.	391.
6 10	278.	1764.	471.
6 20	296.	1828.	550.
6 30	314.	1901.	641.
6 40	332.	1985.	767.
6 50	349.	2066.	889.

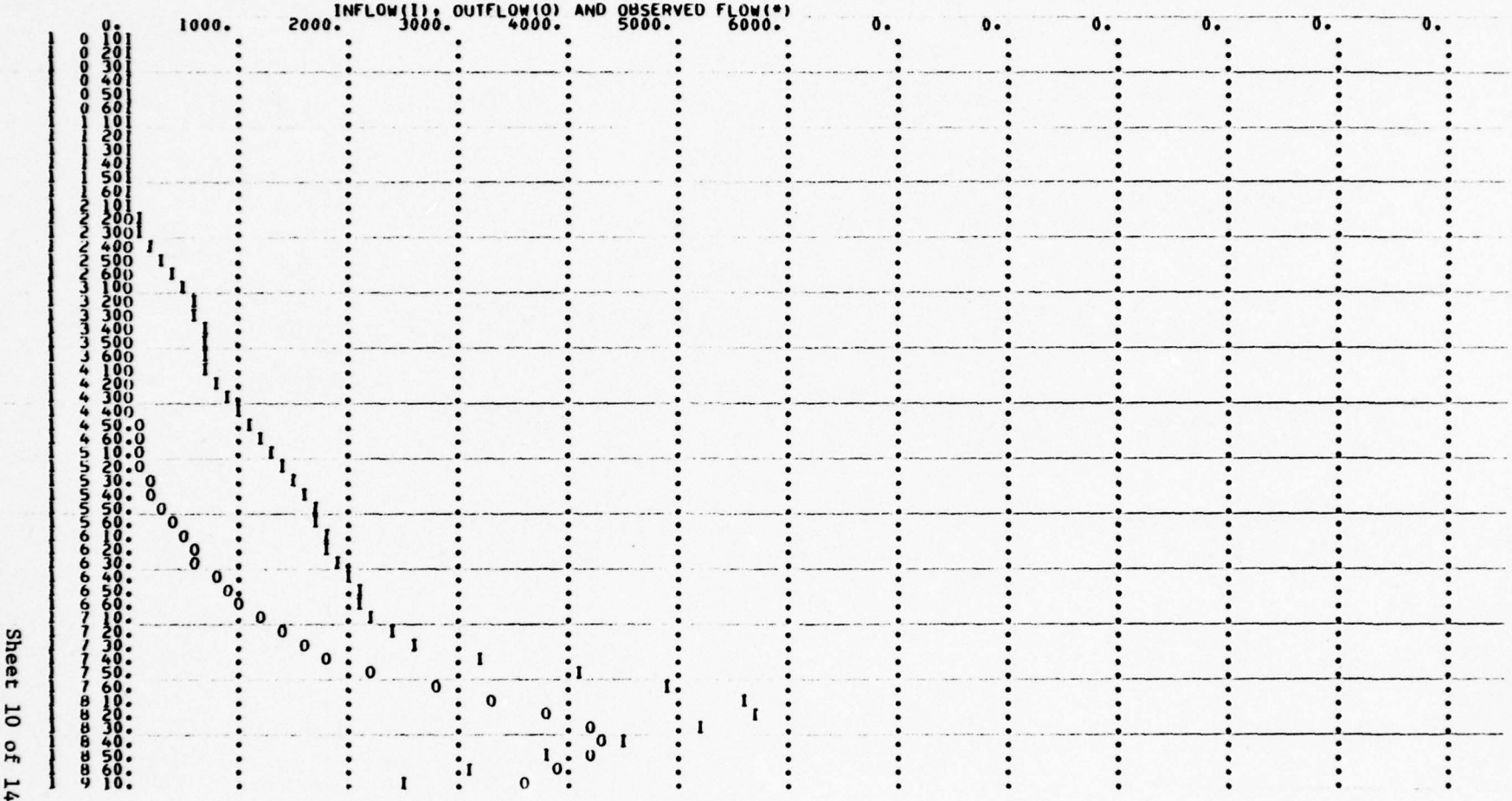
6	60	365.	2132.	1006.	
7	10	381.	2214.	1175.	
7	20	396.	2359.	1362.	
7	30	412.	2610.	1560.	
7	40	432.	3195.	1819.	
7	50	461.	4066.	2212.	
7	60	494.	4912.	2754.	
8	10	529.	5590.	3323.	
8	20	558.	5676.	3843.	
8	30	574.	5184.	4208.	
8	40	578.	4511.	4290.	
8	50	572.	3792.	4155.	
8	60	559.	3131.	3876.	
9	10	543.	2544.	3552.	
9	20	526.	2172.	3275.	
9	30	511.	2009.	3021.	
9	40	497.	1896.	2795.	
9	50	484.	1808.	2597.	
9	60	474.	1735.	2424.	
10	10	464.	1646.	2268.	
10	20	455.	1506.	2115.	
10	30	445.	1315.	1972.	
10	40	433.	1075.	1830.	
10	50	421.	831.	1672.	
10	60	407.	632.	1507.	
11	10	394.	477.	1344.	
11	20	382.	366.	1189.	
11	30	371.	300.	1048.	
11	40	361.	278.	972.	
11	50	351.	278.	907.	
11	60	343.	278.	848.	
12	10	336.	271.	793.	
12	20	328.	250.	742.	
12	30	322.	215.	693.	
12	40	315.	167.	643.	
12	50	308.	116.	600.	
12	60	301.	74.	569.	
13	10	294.	42.	538.	
13	20	287.	18.	508.	
13	30	280.	5.	478.	
13	40	274.	0.	451.	
13	50	267.	0.	424.	
13	60	262.	0.	399.	
14	10	256.	0.	376.	
14	20	251.	0.	354.	
14	30	247.	0.	333.	
14	40	242.	0.	314.	
14	50	238.	0.	296.	
14	60	234.	0.	278.	
	SUM			84731.	

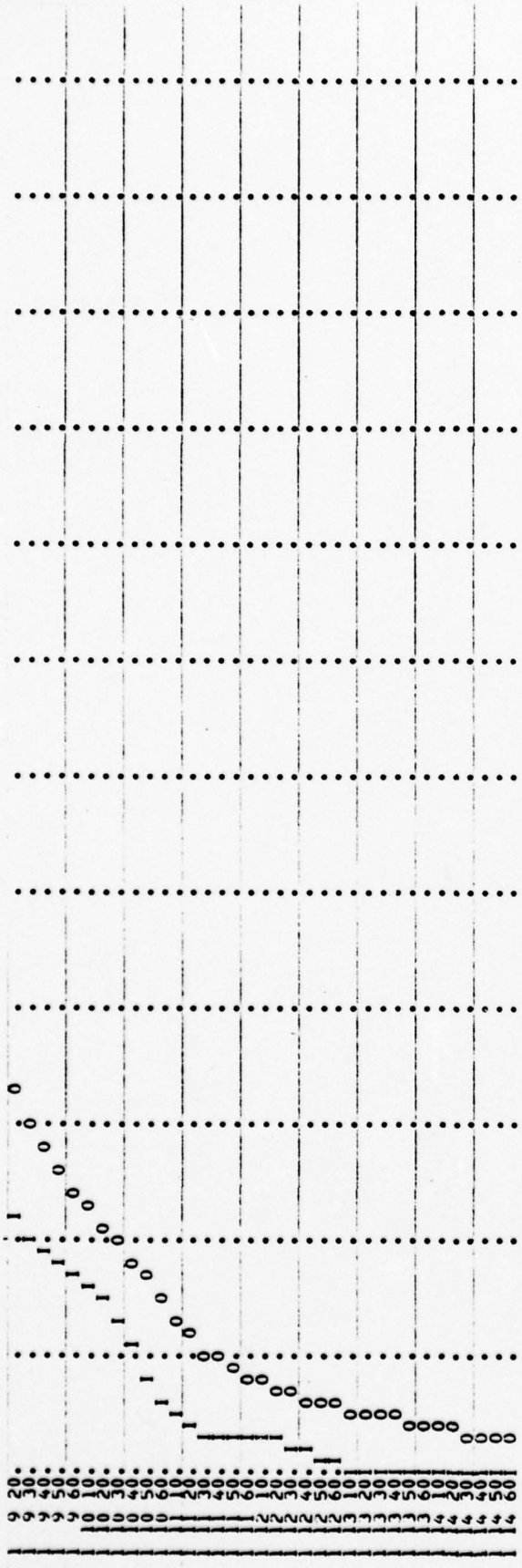
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4290.	2078.	941.	941.	84731.
INCHES		18.59	21.05	21.05	21.05
AC-FT		1031.	1168.	1168.	1168.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)





NAO

RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	5865.	2453.	1123.	1123.	1.04
ROUTED TO	1	4290.	2078.	941.	941.	1.04

```
        M2E0BV7.   08/01/78. *UNITED COMPUTING* 67. APEX/SL D.2.0

08.41.22$RAQUL,CM100000,T20.  RAP 6547 067249000
08.41.22.0674 4695 UCS
08.41.24$AC3400G328303,067249000 .8
08.41.24. 08/01/78.M2E0BV7
08.41.24$FL    32768      0.002         5         3,
08.41.24$FI        0          1
08.41.24.GET,HEC1(LIBRARY)
08.41.25.READY -   HEC1
08.41.25.RFL,150000.
08.41.25$FL     4096      0.004         0         0,
08.41.25$FI        0          1
08.41.27.HEC1.
08.41.27$FLS   53248      0.004
08.41.29$FLR   53248      0.187       349        21
08.41.29.FL REQUIRED TO LOAD     1413228 ( 49874)
08.41.29.FL REQUIRED TO EXECUTE 1237008 ( 42944)
08.41.29$FL    53248      0.196
08.41.32.STOP
08.41.32.GOEXIT.
08.41.32. ILLEGAL CONTROL CARD.
08.41.32.EXIT.
08.41.32$SH*   42944      0.836       236        20
08.41.32.COST.
08.41.32$FL    42944      0.836
08.41.32.           SERV. UNITS-2 =       8
08.41.32.           JOB COST=$        2.00
08.41.32$JT03  12288      0.854         7         5
08.41.32.     *FL*   *CPU SEC. *DISC PRUS* DISC ACC
08.41.32.* LDR PRUS*P.F. ACC *TAPE PRUS* TAPE ACC
```

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT COE

PROJECT Dam Inspection

FILING CODE

W.O. 7249 PAGE 18 OF

SYSTEM Glen Wild Dam

ORIGINATOR ahamid

DATE 07/16/78

CALCULATION FOR Lake Drawdown - pipe Disch. Equation.

REVIEWER [illegible]

DATE 8-1-78

RESULTS

Since the 48 inch dia. pipe constructed downstream of the two 16 inch drain pipes and valves does not influence the discharge thru the drain pipes, then the discharge equation for the system assuming a Manning's $n = 0.015$ and a length of 8 ft will be

$$Q_{cfs} = 15.0564 \sqrt{h_{ft}}$$

this equation was calculated using the data published in: Soil Conservation Service Engineering Field Manual Chapter 3 - Hydraulics USDA - 1969

and following Equation:

$$Q = 2 * a \sqrt{\frac{2gh}{1 + K_m + K_p L}}$$

where: $a = 1.40$ sq. ft.
$K_m = 1.2$
$K_p = 0.0284$

$$Q = 2.8 \sqrt{\frac{64.4 \; h}{2.2 + (0.0284 \times 8)}}$$

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PROJECT Dam Inspection

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W.O. PAGE 19 OF

SYSTEM Glen Wild Dam

ORIGINATOR Wahamik

DATE 07/16/79

CALCULATION FOR Drawdown Times and Volumes

REVIEWER [illegible]

DATE 8-1-79

RESULTS

There are no capacity curves for this reservoir. However, since at the higher reservoir elevations the lake is surrounded by docks, it will be considered that the lake volume stored within the upper 5 feet varies proportionally to the depth in that zone. When I talked to Chuck Jungster on July 15 he mentioned that the deepest point in the lake is 26 ft and that in his opinion the average depth of the lake should be around 15 ft.

If the average depth is 15 ft, then the lake volume stored below the crest of the lowest spillway (El. 351) is:

175 Acres × 15 ft = 2625 Acre-ft

(Note: If the above assumptions are valid; then the water volume stored at the top of the earth Dam is 175(353.04-351)+2625 = 2982 Acre-ft)

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CLIENT C. of E.

PROJECT Dam Inspection

FILING CODE

W.O. PAGE 20

SYSTEM Glen Weld

ORIGINATOR Workman

DATE 07/16/78

CALCULATION FOR Brandon

REVIEWER [illegible]

DATE 8-31-78

RESULTS

2 cfs × 1.04 = 2.08 cfs

$\frac{1799712}{43560} = 4.13$ Acre-ft/Day

2.08 cfs ⇒ 2.08 cfs × 3600×24 = 179712 $\frac{ft^3}{Day}$ =

the contribution of the drainage area is

Water level in ft.	water storage in Acre-ft	diff. in h.d between layers in Acre-ft	diff. in h.d between layers in ft^3	water level under consideration	Quadrangle Area above elevation 346.37	$A = 1.5 \times 0.5 \times h$ in cubic ft in between	Partial time & equity layer combined in hours	Total drawdown Time in hours	Total drawdown Time in Days
351	2625	175	7623000	350.50	4.13	30.60	69.20	0	0
350	2450	175	7623000	349.50	3.13	26.64	79.49	69.20	2.88
349	2275	175	7623000	348.50	2.13	21.97	96.36	148.69	6.20
348	2100	175	7623000	347.50	1.13	16.01	132.30	245.05	10.21
347	1925	175	7623000	346.50	0.13	5.43	390.06	377.35	15.72
346	1750							767.41	31.98

FILING CODE

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CLIENT C. of E.

PROJECT Dam Inspection.

FILING CODE

W.O. PAGE 21 of

SYSTEM Glen Wild

ORIGINATOR Wahanik

DATE 07/16/78

CALCULATION FOR Drawdown

REVIEWER RD Vail

DATE 8-1-78

RESULTS

if we take into consideration the drainage area inflow we obtain the following drawdown times.

Water level.	Partial hours	D.A. correction hours.	Corrected partial Hours	Total hours	Total accumulated Drawdown DAYS
351				0	0
	69.20	1.63	70.83		
350				70.83	2.95
	79.49	1.87	81.36		
349				152.19	6.34
	96.36	2.29	98.63		
348				250.82	10.45
	132.30	3.11	135.41		
347				386.23	16.09
	390.06	9.17	399.23		
346				785.46	32.73

FILING CODE

GAI 350 REV. 10-72

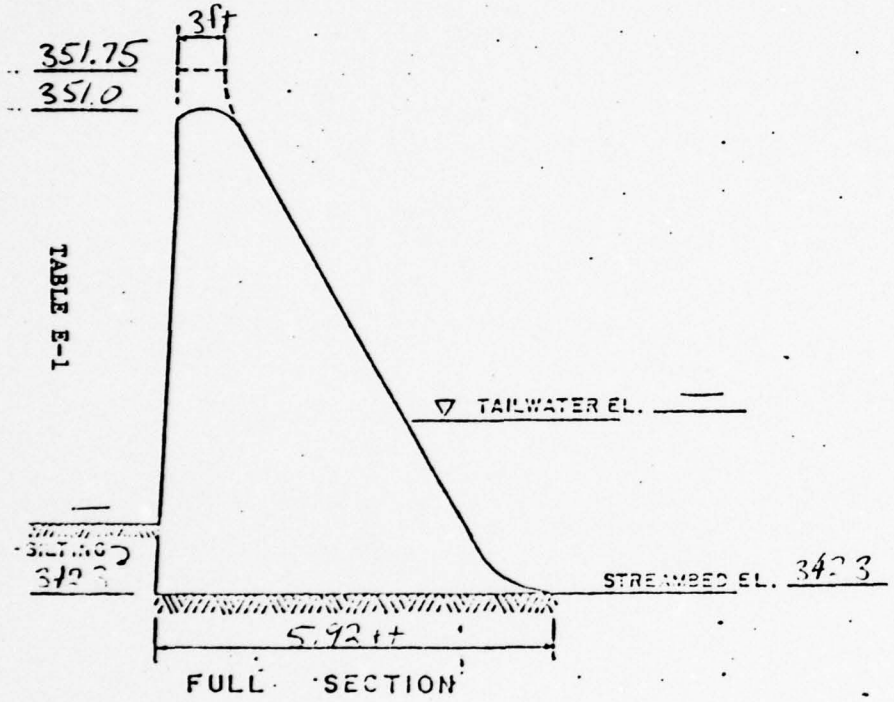
APPENDIX E

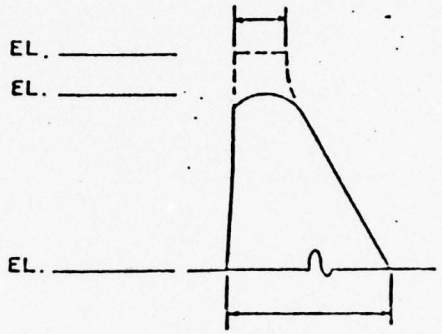
STABILITY ANALYSIS

GRAVITY DAM DESIGN
STABILITY ANALYSIS

ANALYSIS DONE ON X FULL SECTION ___ PARTIAL SECTION
LOCATION OF SECTION TALE GLEN WILD DAM SPILLWAY
ANALYSIS PREPARED BY DC BEECHWOOD

LOADING CASE	ELEV. HEAD WATER	ELEV. TAIL WATER	ΣV	ΣH	ΣH/ΣV	LOCATION RESULTANT FROM TOE	% BASE IN COMPRESSION	FACTOR SAFETY SLIDING	FOUNDATION PRESSURE	
									TOE	HEEL
MAX WATER DEPTH FULL UPLIFT	351.75	—	4.32 K/FT	2.79 K/FT	0.65	1.27 FT	64%	307	2.27 KSF	0
ICE LOADING	351.00	—	4.36	7.36	1.69	-7.60 ft	0%	116	0	0



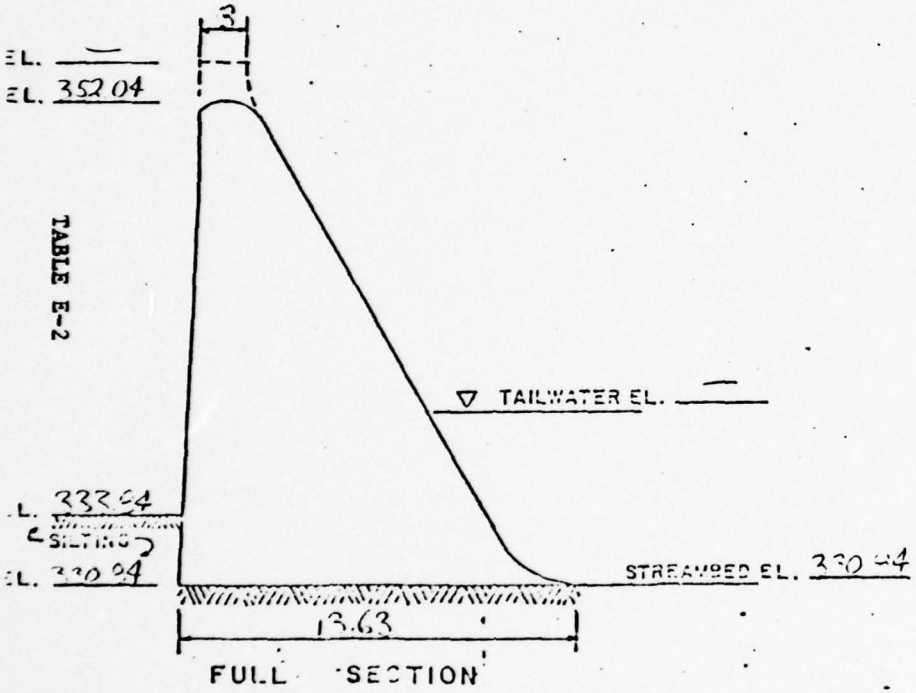


* The base friction parameters assumed for safety factor against sliding are:
cohesion C = 1000 psi
friction Ø = 40°

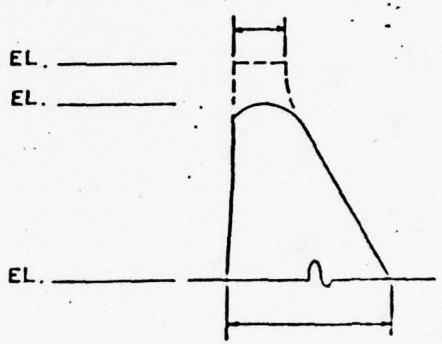
GRAVITY DAM DESIGN
STABILITY ANALYSIS

ANALYSIS DONE ON X FULL SECTION ___ PARTIAL SECTION
LOCATION OF SECTION SECTION A-B GLENWILD DAM
ANALYSIS PREPARED BY D.C. BEECHWOOD

LOADING CASE	ELEV. HEAD WATER	ELEV. TAIL WATER	ΣV	ΣH	ΣH/ΣV	LOCATION RESULTANT FROM TOE	% BASE IN COMPRESSION	FACTOR SAFETY SLIDING	FOUNDATION PRESSURE	
									TOE	HEEL
MAX WATER DEPTH	352.04	—	19.81 K	14.15 K	0.71	3.17 FT	70 %	1.40	4.17 KSF	0
ICE LOADING	351.00	—	20.26 K	17.81 K	0.88	-0.87 FT	0	1.11	0	0



FULL SECTION

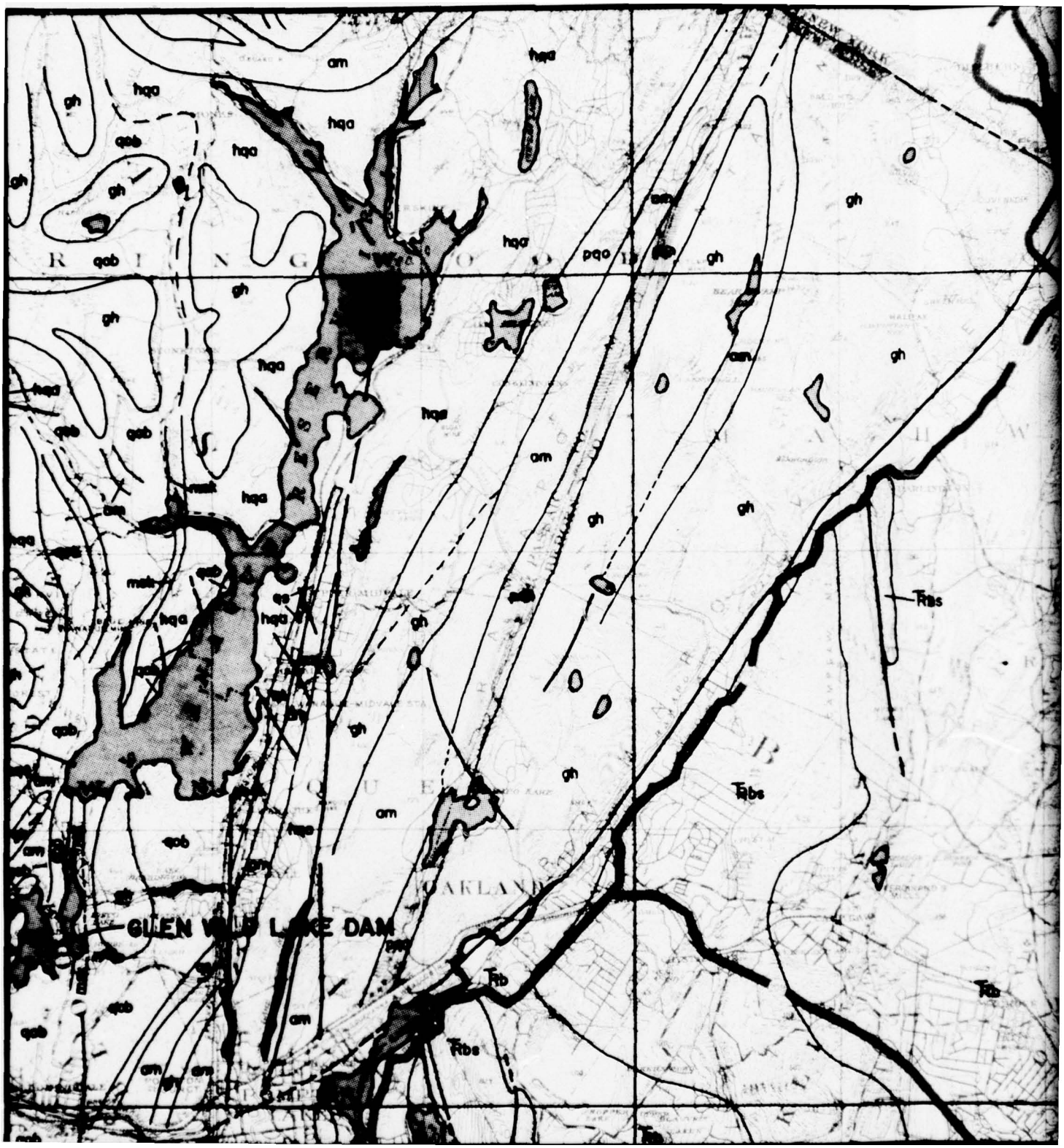


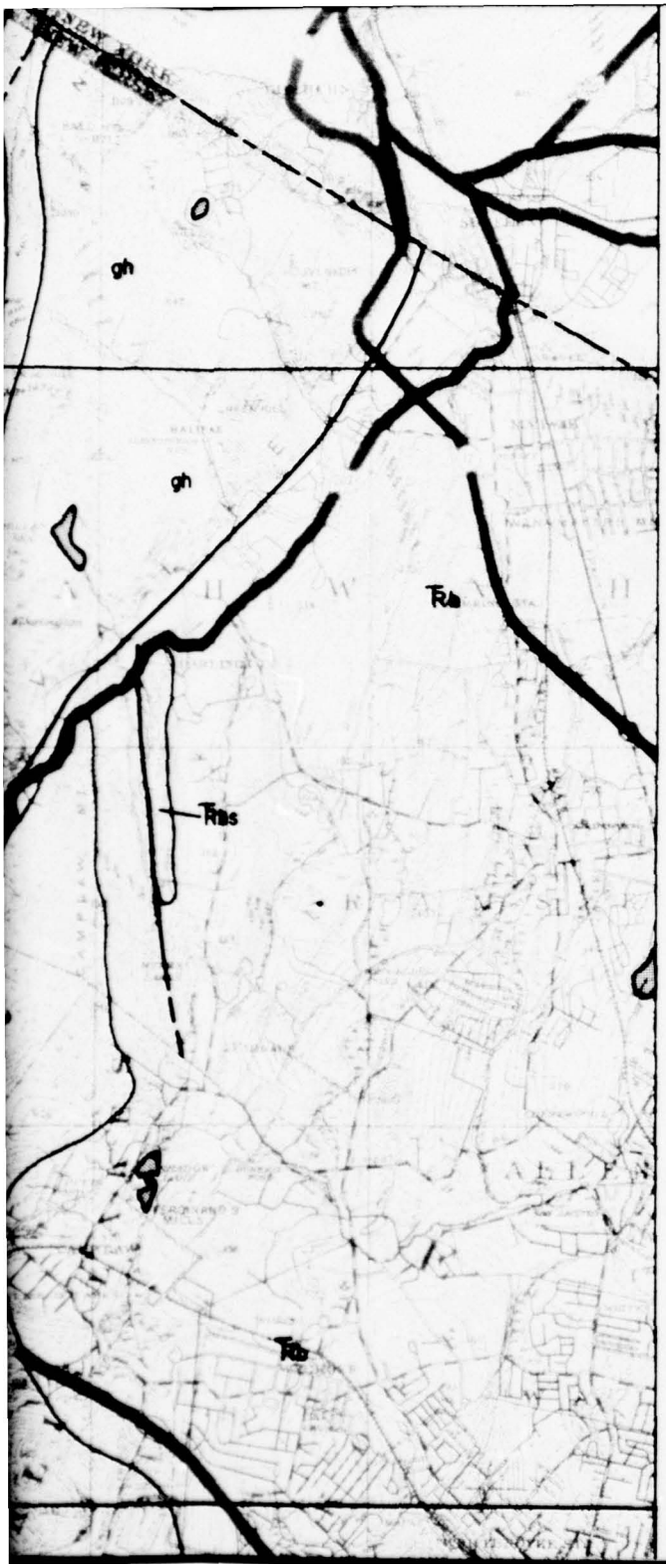
PARTIAL SECTION

* See note on Table E-1.

APPENDIX F

REGIONAL GEOLOGIC MAP


hqa
qab
gh
am
pqo
Tbs
Tb
GLEN



LEGEND

TRIASSIC

Trb	BRUNSWICK FORMATION
Trbs	BASALT FLOWS

PRECAMBRIAN

gh	MOSTLY HORNBLENDE GRANITE AND GRANITE GNEISS
am	AMPHIBOLITE
pqo	PYROXENE GNEISS; MAINLY QUARTZ-OLIGOCLASE - CLINOPYROXENE GNEISS
hqa	PYROXENE GNEISS; MAINLY QUARTZ-ANDESINE GNEISS WITH BOTH ORTHO-AND CLINOPYROXENE
qo	QUARTZ-OLIGOCLASE-GNEISS
qob	QUARTZ-OLIGOCLASE-BIOTITE GNEISS
qs	SILLIMANITE GNEISS
msk	MARBLE AND SKARN

——— CONTACT LINE

——— FAULT LINE

NOTES:

1. THE PRECAMBRIAN MAP UNITS REPRESENT GENERALIZED GROUPINGS OF ROCK TYPES BASED MAINLY ON MINERAL COMPOSITION. THERE IS MUCH LOCAL VARIATION IN THE MINERAL COMPOSITION.
2. THE CONTACT LINES AND FAULT LINE SHOWN ON THE DRAWING ARE DASHED WHERE INFERRED.

SOURCE:

NEW JERSEY GEOLOGICAL SURVEY TOPOGRAPHIC SERIES AND GEOLOGIC OVERLAY SHEETS 23.

1 0 1 2

SCALE IN MILES

APPENDIX F
REGIONAL GEOLOGIC MAP
SHOWING DAM LOCATION

APPENDIX G

CONSULTANT'S REPORT OCTOBER 3, 1977

ERNEST CHRISBACHER, P.E., L.S.
CONSULTING CIVIL ENGINEER

INVESTIGATIONS
REPORTS
DESIGN
SURVEYS
CONSTRUCTION SERVICES

1534 State Highway 23
Peck & Peck Bldg.
Wayne, New Jersey 07470
201-694-7964
201-694-4578

October 3, 1977

Glen Wild Lake Tenants'Association, Inc.
c/o Mr. James Hulsizer
115 Demarest Road
Bloomingdale NJ 07403

Re: Glen Wild Lake
Project No. 113

Gentlemen:

At your request I have made preliminary inspections of the Glen Wild Lake Dam on September 27 and September 30, 1977. I have contacted the New Jersey Department of Environmental Protection, Division of Water Policy and Supply which has a copy of the original plans filed in their Dam File No. 21 (U.S. Dam No. 222). Plans are dated October 8, 1917, and prepared by W.H. Boardman, Consulting Engineer, Newark, New Jersey. The concrete section of the dam has been designed as a gravity-type bulk-concrete structure with a bottom longitudinal key embedded either in ledge rock or down into impervious soil. The earthfill embankment section of the dam is constructed with a rubble masonry corewall down to bed rock. It is lined on the lake face with rock rip-rap to prevent erosion and ice damage.

Observations:

My inspection reveals that the concrete dam is basically sound and appears to have experienced only minor superficial spalling and some transverse temperature or shrinkage stress cracks which do not look serious. There is evidence of only minor leakage through these cracks and no major leaks were discovered in the entire dam.

Mr. Rohan advised me that during very severe storms the spillway section is unable to carry the high volume of runoff water, thus resulting in the concrete

portion of the dam being topped. The overflowing water has caused some minor scouring of earth at the downstream face of the concrete dam. It is unlikely that this minor scouring would result in undermining of the concrete if conventional design practice was used for this type of dam and the toe of the concrete is 36 inches below grade.

The earthfill section of the dam also appears to be basically sound with little or no damage observed to the rip-rap face material. There is, however, extensive vegetative growth along this section with trees ranging from saplings to over 12 inches in diameter. The larger trees, if established within the earthen dam, could cause structural damage by intrusion of large root systems, especially after they die or if blown over by hurricane-force winds. No leaks were observed in this section.

The gate chamber contains two 18-inch cast-iron drain pipes each connected to an 18-inch gate valve. Discharge from the valves is into a junction chamber which bends 90 degrees to a 48-inch concrete pipe. The condition of the gate valves, cast iron pipes and chambers is observed to be generally good. Bolts and nuts on the bonnet flanges of the valves are severely corroded and should be replaced, however pressure at this point is only about 10 to 12 psi and there is no need for immediate concern.

Recommendations:

1. Cracks in the concrete section of the dam should be chiseled out and sealed with an epoxy-type mortar. The lake will have to be lowered in order to do this properly from the upstream face. This must be done before attempting to patch spalling concrete.

2. Spalling concrete should be patched with an epoxy-type mortar after thoroughly loosening, removing and wire brushing all damaged face material. This is not of immediate concern; however, a program should be set up to properly accomplish it.

3. Trees larger than 8 to 10 inches in diameter in the earthen section of the dam should be removed.

4. Because the dam is occasionally topped during

very severe rainstorms, the spillway flash-boards should be rigged with bolted-on pipe handles so that they can be removed during several hours of heavy rain. This will enable the spillway to conduct more water and lessen chances of overtopping the concrete dam. Earth fill should be placed in the eroded areas at the downstream face of the dam.

5. Because of the apparent inability of the spillway to conduct the runoff from very severe storms, and the resulting spread of flow over the length of the concrete dam, it is recommended that the area below the dam be kept free of obstructions so that the overflowing water can safely be carried to the brook.

6. Bolts and nuts on the two 18-inch cast-iron gate valve bornets should be replaced when the lake is drained.

If there are any questions concerning the above matters, I shall be pleased to respond.

Very truly yours,

Ernest Chrisbacher

mlc

CHRISBACHER, BARBIERI ASSOCIATES
CONSULTING CIVIL ENGINEERING

ERNEST CHRISBACHER, P.E.
JOSEPH BARBIERI, L.S., P.P.

11 Furler Street
Totowa, New Jersey 07512
201-694-7964

GILBERT ASSOCIATES
P.O. BOX 1498
READING PA. 19603

DATE MAY 8, 1978
CB Project No. C-1018 (113)
Title GLEN WILD LAKE

ATTN MR. JAMES HAGEN

Gentlemen: We are herewith transmitting the following:

☐ Prints ☐ Specs ☐ Shop Drwgs. ☒ Copy of Letter
☐ Under Separate Cover ☐ Other

Copies	Dated	Description
1	OCT 3 1977	REPORT ON DAM INSPECTION

☐ For Your Approval ☐ For review and comment ☐ Returned for correction
☐ For Your Use ☐ Approved as submitted
☒ As Requested ☐ Approved as noted ☐ Resubmit ___ copies
☐ Other

COMMENTS:

Very truly yours,
R. Chrisbacher
For the Firm

cc:

APPENDIX H

APPLICATION REPORT OCTOBER 31, 1917

Report on Application of the Glenwild Lake Company of Butler, Morris County, New Jersey, to build a Dam for real estate development.

Trenton, N. J., Oct. 31, 1917.

The following report is submitted upon the investigation of the application of the Glenwild Lake Company of Butler, Morris County, New Jersey, to construct a dam on Mud Brook, a stream tributary to the Wanaque River, located about one and one-quarter miles north of Bloomingdale, in Pompton Township, Passaic County, New Jersey, in connection with a real estate development for bungalow sites. The plans and specifications were filed under date of Oct. 9, 1917, by William H. Boardman, of Newark, N. J. In accordance with suggestions from this office, the Company agreed to slight modifications of the plans as set forth on the original drawings, the said changes being noted on the drawing, and also in a letter addressed to Mr. Boardman under date of October 16, 1917. The writer, accompanied by Mr. Boardman and John W. Heller, of South Orange, New Jersey, contractor, made an inspection of the site on Oct. 26, 1917.

Location.- The dam will be located on Mud Brook, a short distance below Mud Pond, and about three and one-half miles above where the brook enters the Wanaque River at Pompton Lakes. The site is about one and one-quarter miles due north of Bloomingdale and can be approached by highway either from Butler or from Haskell. The drainage area above the site contains approximately 1.25 sq. miles and is oblong in shape. The area is exceedingly rough and covered with timber growth. The geological formation is gneiss rock which out-crops along the slopes as vertical cliffs, and in the bottom of the valley has large rock ledges. The land immediately surrounding the present Mud Pond is flat and swampy, being limited by the steep slopes of the adjoining hills. A section of Sheet No. 25 New Jersey Geological Survey, accompanying the application, shows the watershed area and the location of the proposed dam.

Description of Dam.- The type of dam proposed, as shown on general plan and sections of dam, under date of Oct. 8, 1917 accompanying the application, will be a combination of the masonry dam, having a maximum height above bed rock of 21 feet, and a maximum height above the stream bed of [illegible] feet and a practical length of approximately [illegible] and an earth fill dam having a maximum height above the original surface of [illegible] feet and a total length of approximately [illegible]

The Masonry section will be made up of cyclopean concrete having an up-stream slope of 1/2" per foot and a down-stream slope of 7" per foot, the [illegible] being [illegible] and having a reference elevation of 105.00 throughout the entire length, with the exception of a [illegible] which has an elevation of 102.85, and will act as a spillway under normal discharge. The masonry section will rest upon bed rock throughout the entire length and will be properly keyed by means of a cut-off trench excavated into the bed rock. The 140 ft. spillway section just referred to will have a slightly different cross-section as follows: The up stream slope being 1/2" per foot, and the down-stream slope 3-1/2" per foot, the top being rounded on a 3 ft. radius to facilitate the flow of water. There will be a 16" sluice pipe and gate through the masonry structure at the center line, elevation of 87.60, and located approximately at the present stream channel. The normal water level of the pond will be elevation 103.00, corresponding with the lowest portion of the spillway. The earth fill section will have an up-stream slope of 2-1/2:1 with a substantial paving throughout the entire slope, and down-stream slope of 2:1 and a top width of 8 ft. The cut-off wall will consist of a combination cyclopean concrete and rubble masonry core wall, having a top width of 2 ft. and a batter of 1/4" per foot on both the up-stream and down-stream sides. This core wall will extend to ledge rock or into an impervious soil. The elevation of the top of the earth fill will be 108.00, the revised elevation of the top of the core wall will be 106.00, meeting the requirements of this office, namely, that the top of the core wall shall have an elevation equal to the maximum water level in the pool. The specifications filed with the application provide for suitable placing of the materials going to make up the structure, the earth filling being a local clay having very little sand or gravel mixed with it. The site of the earth fill will be properly cleared and the top soil removed before placing the clay filling. The concrete will be a 1-2-4 mixture, the rubble masonry will be set up in a 1-2 mortar.

Reservoir.- The reservoir to be formed will absorb Mud Pond, which is immediately up stream from the dam site, and Witteck Lake, which lies about one-quarter of a mile south-west of the site, and which originally flowed out through a small brook into the Pequannock River at Butler, but can be held back by means of a dam which has been placed across the outlet. The estimated water surface area will be [illegible] acres. The capacity of the reservoir has not been determined. The Mud Pond is said to be quite deep in some places, but Witteck Lake is comparatively shallow. The flooded area does not include any highways or other improvements, and consists principally of swamp lands surrounding the present pools at the foot of the steep slopes of the encircling hills.

Spillway.- During flood conditions, the entire masonry section will act as a spillway, and assuming the head of 0.6 feet, will have a discharging capacity of approximately 540 cu. ft. per second, or 430 cu. ft. per second per square mile. This provision would seem to be ample for protecting the earth fill section from being over topped. During normal conditions of run-off, the 40 ft. section of the masonry dam,

which has an elevation of 102.25, will provide for a head of 0.75 ft, without over-topping the main portion of the masonry dam, and will accommodate a total flow of approximately 45 cu. ft. per second. Within the 40 foot section there is a 6 ft. length, which has a slight depression, having an elevation of 102.00. The 16" sluice pipe through the masonry structure at the present stream channel will accommodate the normal flow of the stream during construction.

Valley Below the Dam.- A short distance below the dam a swamp extends along the stream for a distance of about a quarter of a mile, making the fall of the stream very slight. At the outlet of the swamp the stream descends rapidly, paralleling the highway for a distance of one and one-quarter miles crossing the same at two points, the first one being one and one-quarter miles below the dam, and the second one, one and three-quarters miles below the dam, where it also crosses under the Greenwood Lake railroad. At this latter point, the stream enters a broader valley, which continues to the junction of the Wanaque River at Pompton Lakes, a distance of approximately 2 miles, the fall of the stream being very flat in this stretch. In case of sudden failure, the highway bridges and the railroad, would possibly suffer some damage. Below the railroad crossing the broad valley and the flat slope of the stream would probably prevent damage to any structures or improvements on the lower course of the stream.

Conclusions and Recommendations.- As a result of a careful study of the plans and specifications, and an inspection of the dam site, including some of the foundation material for the core wall of the earth fill dam, which was opened up at the time of the inspection, it would seem that the successful carrying out of said plans and specifications will result in the construction of a structure that will be reasonably safe, and will not unduly endanger life and property in the valley below. The earth section of the dam has very flat slopes, and the core wall will extend to an impervious stratum, the masonry section has a factor of safety against over-turning of 1.6, and the spillway capacity is ample for the character of the water-shed above, and the channel conditions below the pool. It is therefore recommended that the revised plans and specifications of the Glenwild Lake Company, of Butler, New Jersey, for the construction of a dam on Mud Brook, a small tributary to the Wanaque River, for the purpose of a real estate development, as set forth in the application and accompanying plans and specifications, be approved subject to the following conditions:

1.- That the work shall at all times be subject to the supervision and inspection by representatives of this Board, and that no changes in the plans and specifications as approved shall be made, except with the written consent of this Department. That the Board further reserves the right to suspend or revoke this permit at any time, should such action be deemed necessary in the interest of public safety.

2. That the work shall be under the direction of a competent engineer, and that he or a competent representative, shall be on the ground frequently during the construction, and until the completion of the dam.

3. That this Board shall be notified in advance of the proposed time of commencement of this work of this work; that no materials shall be placed on any portion of the foundation until such portion of the foundation has been approved in writing by a representative of this Board.

4. That if this work is not completed within two years from date of the approval of this application, the permit, if not previously revoked or specifically extended, shall cease and be null and void; and if upon the expiration or revocation of the permit the work shall not be completed, the Glenwild Lake Company, of Butler, New Jersey, shall at its own expense, remove all or any portion of the uncompleted work and restore the water course to its former condition; that no claim shall be made against the State on account of such removal or alteration.

Respectfully submitted,

H. T. Critchlow

Water Engineer.

October 16, 1913.

Mr. William H. Boardman, Cons. Engr.,
31 Maple Avenue,
Newark, N. J.

Dear Sir:

Dam - Glenwild Lake Co.

As a result of a preliminary study of the plans and specifications for the dam to be built under your direction for the Glenwild Lake Company near Bloomingdale, Passaic County, N. J., our water engineer favors the approval of these plans, with slight modifications as follows:

Core Wall.- Construct same to reference elevation 94.0, an increase of 0.5 foot, so that floods may be accommodated without raising water level above the top of the core wall. This would allow a maximum head of 0.5 throughout the entire length of the spillway, giving it an estimated discharging capacity of about 400 cubic feet per second per square mile.

Spillway Section.- An analysis of the spillway section at maximum height above rock (12 feet) indicates that the resultant intersects the base about .5 ft. without the middle third. This weakness is not vital on account of the relative short section (8-10 feet) having the maximum height, but it could be remedied by constructing an outward curve of about a 3 ft. radius below elevation 94.0, making the thickness at elevation 91. the same as for the section of the main masonry dam.

The following standard conditions will be attached to the formal approval:

1. That the work shall at all times be subject to supervision and inspection by representatives of this Board, and that no changes in the plans and specifications as approved shall be made except with the written consent of the Director of Conservation and Development. That the Board further reserves the right to suspend or revoke this permit at any time should such action be deemed necessary in the interest of public safety.

2. That the work shall be under the direction of a competent engineer, and that he or a competent representative shall be on the ground frequently during construction and until the completion of the dam.

3. That this Board shall be notified in advance of

W.L.B. 12

October 16, 1917

the proposed time of commencement of this work; that no material shall be placed on any portion of the foundation until such portion of the foundation shall have been approved in writing by a representative of this Board;

That if this work is not completed within [illegible] years from date of the approval of this application, the permit, if not previously revoked or specifically extended, shall cease and be null and void; and if upon the revocation or expiration of the permit the work shall not be completed, the Glenville Lake Company shall at its own expense, and to such extent and in such time and manner as this Board may require, remove all or any portion of the incompleted work and restore the water course to its former condition; that no claim shall be made against the State on account of such removal or alteration.

I do not doubt that the Board will approve your application at its next meeting and, therefore think that you can safely go on with your work. It must be understood, however, that you take whatever risk there is in anticipating formal action.

DEPT. OF CONSERVATION AND DEVELOPMENT

Director.

71 Mapes Avenue, Newark, N. J.

October 8th, 1917.

RECEIVED

Department of Conservation & Development,

State House,

Trenton, N. J.

Dear Sirs:

Enclosed please find drawing showing General Plan, Cross Section and Elevation of Earth Fill and Concrete Masonry Dam to be built for the Glenwild Lake Company on Mill Brook, about a mile north of Bloomingdale, N. J.

The drainage area above proposed dam is approximately one (1) square mile.

Estimated water surface 175 acres.

Sections for solid masonry dam are designed for a safety factor of 2.5.

1-2-4 concrete is specified.

1-2 mortar for the rubble masonry.

Will you kindly have drawing passed upon as soon as possible. The owners have been held up until now acquiring property. I would like to get actual construction started as soon as possible, owing to advancing cold weather.

Very truly yours,

William H Bradshaw

Consulting Engineer.

July 30, 1918.

Mr. John W. Heller.,

P.O. Bldg.,

S. Orange, N. J.

Dear Mr. Heller:-

I made a trip over to the Glenwild Lake Company Dam on the 11th.inst., being accompanied by a few of the boy scouts who were in camp in the Ramapo Hills, north of Oakland. You superintendent "Van" was on the job and told me that the work on the dam had been completed about the first of the month. I was very much pleased with the appearance of the structure and trust that the seepage through the same will be a negligible quantity even after the water level is up to maximum. I am enclosing a few prints which you may be interested in. You can give the extra prints showing the spillway to "Van" with my compliments.

Yours very truly,

Water Engineer.

APPENDIX I

REFERENCES

REFERENCES

1. Design of Small Dams, U.S. Department of the Interior, Bureau of Reclamation, 1973.

2. "Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian," U.S. Weather Bureau Hydrometeorological Report No. 33, 1956.

3. "HEC-1 Flood Hydrograph Package," Hydrologic Engineering Center, U.S. Army Corps of Engineers, January 1973.

4. Magnitude and frequency of floods in New Jersey with effects of urbanization. Special report 38 - Stephen J. Stankowski, U.S.G.S.

5. Chapter 2 - Estimating runoff, Soil Conservation Service, Engineering Field Manual USDA 1969.

6. National Program of Inspection of Dams, Volume III, May 1975 - Department of the Army, Office of the Chief of Engineers, Washington, D.C.

7. Recommended Guidelines for Safety Inspection of Dams, Washington, D.C., Department of the Army, Office of the Chief of Engineers.

8. Personal communication with Mr. Herbert Califano, the Owner's Representative, July 1978.

APPENDIX J

CONDITIONS

APPENDIX J

CONDITIONS

This report is based on a visual inspection of the dam, a review of available engineering data and a hydrologic analysis performed during Phase I investigation as set forth in the Recommended Guidelines for Safety Inspection of Dams, as modified by the contract between the U.S. Corps of Engineers and Gilbert Associates, Inc., Contract No. DACW61-78-C-0114.

The foregoing review, inspection, and analysis are by their nature limited in scope. It is possible that hazardous conditions exist and that conditions exist which with time might develop into safety hazards and that these conditions are not detectable by means of the aforesaid review, inspection, and analysis. Accordingly Gilbert Associates, Inc. cannot and does not warrant or represent that conditions which are hazardous do not exist, or that conditions do not exist which with time might develop into safety hazards.

As required by the Corps of Engineers the terms "good", "fair", "poor", "condition" have been used in this report to characterize the information obtained from the aforesaid review, inspection, and analysis. The definitions of these terms as used are:

"good condition" - minor studies or remedial measures are required.

"fair condition" - sizeable studies or remedial measures are required due to deficiencies which could be hazardous depending on conditions. Immediate attention is required.

"poor condition" - major studies or remedial measures are required due to deficiencies which could be hazardous depending on conditions. Immediate studies or corrective action is required.